News By Teletype From 4 News Bureaus

National Petroleum News

News From Oil Industry Everywhere

VOLUME 30 WEDNESDAY, AUGUST 24, 1938 NUMBER 34

New Deal Tips Its Hand on Federal Oil Control

HIGHLIGHTS OF THE NEWS

REFINERS VS. PIPELINES

WASHINGTON — A group of Mid-Continent refiners has complained to ICC that pipelines and railroads are violating Interstate Commerce Act. See Page 10.

INDIANA STANDARD CASE

DETROIT — Hearing on Indiana Standard's indictment under anti-discrimination law brings out "reasons" why the company sells one large Detroit gasoline retailer at tank car prices. See Page 11.

WELL-SPACING LAWS

TULSA — Well-spacing laws face same rocky course pioneered by oil proration legislation. First article on this important topic appears on Page 21.

GASOLINE REPORT

NEW YORK — American Petroleum Institute begins weekly reports on gasoline production, covering approximately 90 per cent of U. S. refining capacity. See Page 23.

HITS 'FREE' SERVICE

LOS ANGELES — Dealer association turns from price-maintenance suits to legal steps against "free" services at filling stations. See Page 12.

O'MAHONEY AND OIL

WASHINGTON — Oil industry witnesses are likely to be among first witnesses subpoenaed by O'Mahoney anti-monopoly committee so read what's in store for them in Editor Platt's story beginning on this page.

SEPTEMBER DEMAND

WASHINGTON — Bureau of Mines predicts a decrease of about one-half of one per cent in domestic gasoline demand, but, even if fulfilled, 1938 demand would still be ahead of 1937.

3 East Texas Refiners Cut Crude 15 Cts.

By Teletype
N. P. N. News Bureau

TULSA, Aug. 23. — A break in the East Texas crude price situation, long expected, came Aug. 20, when the East Texas Refining Co. of Dallas, reduced its posting 15 cents to $1.20 per barrel.

Other buyers, however, were slow about making a change and, by the evening of Aug. 23, only two companies besides East Texas Refining had posted the lower price.

Danciger Oil & Refineries, Inc., through its Longview gathering system, announced the change Aug. 22, making the new price effective Aug. 21. Premier Oil & Refining Co. of Willow Springs made its change effective Aug. 23.

The three companies together account for about 13,600 barrels of crude takings a day. East Texas Refining's recent runs have been about 5600 barrels, Premier uses about 2000 barrels and Danciger about 6000 barrels.

Quotations on gasoline by re-

(*Continued on page* 19)

Texas Commission Withdraws Tender On Imported Crude

By Teletype
N. P. N. News Bureau

TULSA, Aug. 23. — Forecast tender on imported oil issued to Eastern States Petroleum Co., for one cargo of 100,000 barrels of Mexican oil has been cancelled, Col. E. O. Thompson, Texas railroad commission, told NATIONAL PETROLEUM NEWS today.

"We made tests and found that the oil tested 49.3 gravity," he said. "The tender had been issued on crude oil. I understand the test is that if it will burn in an internal combustion engine, it is not crude. The difference of opinion here is over the classification."

Col. Thompson said he did

(*Continued on page* 20)

Remarks Of Berle And Arnold Hint At Oil's Fate In O'Mahoney Probe

The oil industry's great problem today is its relation to government.

Changes are in the making that threaten to take not only the title to at least part of the oil industry away from their owners, but particularly many phases of management.

Discussions over these changes will be long, even tedious, but as the oil man values his duty to his stockholders, his business and himself, he will work to understand them that he may have an intelligent opinion.

Herewith is an analysis of the first comprehensive material that the New Deal has put out as to what it may have in mind to try and do to the oil industry. The high standing of the speakers in the new inner councils of New Deal should command the most serious attention to what they say. A careful study of their remarks should give one a fair idea of what now seems to be in the minds of the New Deal as to all business and particularly as to the oil industry—W. C. P.

By WARREN C. PLATT, Editor

CLEVELAND, Aug. 23

Prepared public statements issued last week by two men on the inside of the New Deal and its Brain Trust, would seem clearly to confirm the suspicion of some years, that the Roosevelt Administration plans to try and put the oil industry under a measure of federal government control, like a public utility or a "controlled cartel system."

The extent of this control would include regulation of crude oil production and stocks, presumably regulation of refinery operation and stocks and finally the regulation of oil prices, to see that the industry did not indulge in "rigid" prices that brought about unemployment and that did not develop an expanding marketing sufficiently.

This plan is to be put over through the medium of the monopoly investigating committee of Congress now operating, supported by attacks from the Department of Justice to help show the "need" for such control and also to keep the oil industry on the defensive politically. At least this would appear to be the plan of the maneuver.

The makers of these two public statements last week, which seem to warrant the above conclusions, are:

Thurman Arnold, assistant U. S. Attorney General in charge of the Anti Trust Division of the Department of Justice.

A. A. Berle, Jr., who draws pay as an assistant Secretary of State but who is recognized as having little to do with the State Department but devotes his time and his talents to the activities of the inner Brain Trust.

In addition to these two statements, there is the radio statement of a month ago by Senator O'Mahoney of Wyoming, chairman of the monopoly investigating committee, citing the shutting down of the Standard of Indiana refinery at Casper, Wyo., as showing the need for some national control of the oil industry (See page 13, N.P.N. July 13, 1938), as per his national incorporation bill.

O'Mahoney and Arnold are members of the monopoly investi-

(*Continued on page* 15)

Refiners' Suit Hits Gasoline Pipelines

By Teletype
N. P. N. News Bureau

WASHINGTON, Aug. 23.—Charges that present rail and pipeline rates for transportation of petroleum products from the Mid-Continent are in violation of Sections 1, 2, 3 and 6 of the Interstate Commerce Act are contained in a complaint filed with the Interstate Commerce Commission by the Petroleum Rail Shippers' Assn.

The petitioners ask the ICC to hold hearings to investigate the charges and to establish new rates which will be "reasonable and not discriminatory."

The Petroleum Rail Shippers' Assn. is composed of a group of Mid-Continent refiners who move their products entirely by rail or by rail and truck. The association was formed several weeks ago at a meeting in Fort Worth, and James F. Lawrence, rate attorney of Tulsa and Washington, was retained to represent the organization.

The petition filed with the ICC devotes considerable space to an attack on the gasoline pipeline companies. It reviews the ownership of the gasoline pipelines and then alleges that the pipeline companies "so owned by the refining companies using said pipelines . . . have published and maintain excessive and unreasonable rates and that through stock ownership the excessive dividends resulting from said excessive rates are given to the shipper using said pipelines and thereby shippers . . . . receive indirect rebates and concessions . . . . and products so transported are at less than the lawfully established rates and an advantage is given the shippers."

Rebates Charged

The charge also is made that the pipeline companies violate the Elkins Act, "in that through said stock ownership and said methods aforesaid shippers receive concessions and discriminations and that said stock ownership and said practices amount to a device whereby shipments are made at a less rate than named in the tariffs published by said pipeline companies in violation of law.

"Because of the facts aforesaid said pipeline companies are not in fact bona fide common carriers and are dummy corporations organized by certain shippers who are owners of the stock for the purpose of receiving rebates in the form of stock dividends and for the purpose of procuring transportation of their products at a cost materially less than that paid by competitors and users of railroads for transportation of their products who are required to pay the regular tariff rate for the same service."

The complainants also declare that they are forced, by reason of the conditions set out in the petition, to pay a rate from 1 to 3 cents per gallon excess for the transportation of their products from the Mid-Continent area to destination points, and that they are being placed at the mercy of the affiliated refining companies and that the carriers are using this power with the intent to remove the production of these independent refiners from the markets and from the field of competition, and that "in a short time it will inevitably result in a dominating control of a necessity of life and eliminate the independent competition of these complaining refiners."

'Rails Aid Pipelines'

In the charges against the railroads the statement is made that they have continuously ignored their own interests and the interests of the public and have exacted prohibitive rates for long haul movements of these complainants to destination territory and have accepted a less remunerative rate on petroleum handled in connection with pipelines.

"The railroads have thereby depleted their revenues," the petition states, "and if transportation charges by common carriers were equalized the petroleum products shipped by these complainants would increase the revenues of the carriers fifty million dollars annually over the present profits."

Kansas May Require Contractors To Use Locally-Made Fuels

N. P. N. News Bureau

TULSA, Aug. 20. — Opinion has been given by the attorney general of Kansas to Gov. Walter A. Huxman that the state has the right to require contractors on state highways and other projects to use motor fuel made from Kansas crude in such work.

Endorsement of this position was expressed by H. A. Meyer, managing director of the Kansas Independent Oil & Gas Association, which was organized several months ago and which has a large membership of Kansas producers.

Meyer said in a letter to the governor that the "pitifully meager" market outlet for Kansas crude is due to the "persistent refusal of certain large interstate purchasing companies to accord to Kansas more than just a few crumbs of their over-all crude oil requirements." The same companies "are quick to seize upon the Kansas market for sales of their gasoline and other refined products, the bulk of which is manufactured from Oklahoma and Texas crude," he added.

Meyer concluded his letter by saying that "your appreciation of this situation and your forthright action in having the state lead off in the adoption of this reciprocal policy is encouraging in the efforts to stimulate the market for Kansas oil and as such merits the approbation of all Kansans."

American Oil Co. To Specify Prices In New York City

By Teletype
N. P. N. News Bureau

NEW YORK, Aug. 23.—American Oil Co. has announced it is signing contracts with its dealers in New York City wherein minimum prices for two of its three grades of branded gasoline will be posted under the Feld-Crawford fair trade law.

American, a subsidiary of Standard of Indiana, posted minimum of 17.5 cents for Orange (regular) and 20.5 for Amoco (premium), which sells at 3 cents over regular grade. No minimum price was established for Artex, the company's third grade gasoline.

Only two major companies—Sinclair and Gulf—have not announced whether or not they will stipulate minimum prices for their branded gasoline in the New York area.

New Note To Mexico

WASHINGTON, Aug. 23. — State department today revealed that a second note on the Mexican government's expropriation of American properties was handed to Mexican Ambassador Najera on Aug. 22. Contents of the note were not made public so it was not known whether it concerned the expropriated oil properties or farm lands. The first note concerned Mexico's failure to pay for seized farm lands.

Illinois Output Soars, Nearing 60,000 Barrels

N. P. N. News Bureau

TULSA, Aug. 20.—The Texas Co. on Aug. 15 made first runs of crude from the new Lake Centralia, or Tate, pool, east of Centralia, Ill., through its new four-inch line to Sandoval station on the Illinois Pipe Line Co. system. The line is nine miles long. Initial runs were about 1100 barrels daily.

The state's production, already near the 60,000-barrel daily mark, will be increased further with completion of the Oklahoma Pipe Line Co.'s short five-inch line from the Beecher City pool in Fayette county to the Brownstown station on the Illinois Pipe Line Co.'s main line.

Runs during the week ended Aug. 10 were nearly 45,000 barrels a day from pools that have been found in the past 20 months. The Owensboro Corp. (Standard of Ohio) accounted for about 18,000 barrels and the Pure Oil Co. took substantially the same amount. The three skimming plants at Centralia were credited with takings of 3000 barrels daily.

The brisk drilling pace showed no signs of abating in the week ended Aug. 17 when 60 new locations were counted, most of them in the shallow sand areas of Clinton, Marion and Fayette counties.

Venezuelan Exports Are 15% Above 1937

N. P. N. News Bureau

WASHINGTON, Aug. 22.—Exports of crude and petroleum products from Venezuela in the first six months of 1938 amounted to 88,039,619 barrels, an increase of about 15 per cent over the same period in 1937, according to a report received by the U. S. Bureau of Foreign and Domestic Commerce. Venezuelan exports in the January-June period of 1937 totaled 76,479,905 barrels.

Venezuelan production amounted to 90,227,719 barrels in the first half of 1938; last year, in the same period, the crude output was 84,260,269 barrels. Production in June was 16,310,602 barrels, up about 34,000 barrels over June, 1937.

Indiana Standard Price Policy Aired at Detroit

Manager Explains Why Standard Sells To Large Retailer At Tank Car Price

DETROIT, Aug. 22.—In the latest case to be heard in local courts here on charges of violation of Michigan's Fair Trade Law, a supplying company is accused of offering a price advantage to a particular retailer.

In previous cases brought under this law in Michigan courts, the defendants have been principally retailers, and charges have been confined generally to their selling below cost or to offering premiums.

In this case, a preliminary examination of the Standard Oil Co. of Indiana on charges of price discrimination among its dealers, P. A. Raupagh, Detroit manager for Standard, brought out that his company did not differentiate between a wholesaler and a retailer in determining an operator's eligibility to receive gasoline at tank car prices. The examination was held Aug. 18-19 before Recorders Judge Arthur E. Gordon here.

In order for an operator to buy at tank car prices, Raupagh testified that Standard requires that he shall have a volume of about 1,000,000 to 2,000,000 gallons annually, that he should have ample credit responsibility, and that he should have the necessary physical equipment to handle tank car shipments.

Specifically, the prosecution, headed by assistant county prosecutor Ralph Garber, contended that Standard supplied gasoline to Ned's Auto Supply Co. at tank car prices, which are 1.5 cents lower than the tank wagon price at which Standard supplies hundreds of dealers in the Detroit area.

Garber introduced as witnesses present and former Standard dealers, who contended that they had approached their supplier with a proposition which would enable them to get a similar margin as given to Ned's, but they testified Standard refused them.

Discrimination Charged

This price advantage, prosecutor Garber charged, enabled Ned's to undersell other Standard dealers and competitive dealers. He further charged that, through this deal with Ned's, Standard was discriminating against its other dealers, by offering one dealer gasoline at a lower price than it offered all other dealers, and that this was done "with intent to injure or destroy the business of a competitor" and as such was a violation of the Michigan Fair Trade Law.

Defense counsel Arthur J. Abbott, representing Standard, argued that the Indiana company was justified in selling to Ned's at tank car prices because Ned's, through its totally owned Merchants Supply Co., received gasoline from Standard in tank car lots at its own bulk plant and hauled the gasoline from that point to its own stations in its own trucks.

Records introduced at the hearing pointed out that, between the period of March 1 to 7, gasoline was shipped to the Merchants Supply Co. by Standard at tank wagon prices. On March 7, the Merchants Supply Co. placed in operation a bulk plant, at which time Standard began shipping gasoline to this point at tank car prices, it was said.

Other Offers Cited

Sam Gershenson, a partner in the Ned's company, testified that, previous to the time of acquiring a bulk plant, his company had been approached by other major companies who offered to sell him at tank car prices.

It was charged by Garber that the Merchants Supply Co., totally owned by the management of the Ned's company, operated without a state-required wholesalers license, that it supplied gasoline only to Ned's five outlets, and that, therefore, it was a part of Ned's retail organization and not entitled to a wholesaler's margin.

Sam Gershenson testified that the Merchants company did not have a wholesaler's license, adding that the state department told him that no license was needed as long as the gasoline was being delivered only to the company's own outlets.

Charles Gershenson, brother and partner of Sam, testified that the Merchants Supply Co. was registered with the state as Sam Gershenson, doing business as the Merchants Supply Co., but that all the Gershenson brothers had a financial interest in the company. He testified further that, for four years previous to its setting up a gasoline storage plant, the Merchants company had been a distributor of automotive accessories and household appliances, selling to all types of dealers, and doing an annual business of from $300,000 to $500,000 a year.

In defending the Ned's deal, Raupagh testified that the fact that an operator is a wholesaler or a retailer does not enter into his "eligibility" to receive gasoline on a tank car basis.

Sells Three Others

In response to questions by Prosecutor Garber, Raupagh stated that four distributors in Wayne County were purchasing gasoline from the Indiana Standard at tank car prices. He identified these as the Wayne Oil Co., Citrin-Kolb Oil Co., Stikeman Oil Co., and Ned's Auto Supply Co. Of these, Garber pointed out that the latter was the only one not having a wholesaler's license.

Asked if other retail dealers had ever applied to Standard for shipment on a tank car basis, he replied that they had, but that his company had refused to consider these requests either because the dealers did not have sufficient volume, or that they lacked the proper credit backing, or that they did not have adequate facilities to handle this type of shipment.

Raupagh was asked if his company would consider tank car shipments to a group of dealers who had combined in order to buy in larger quantities, to which he replied, "That all depends". In reply to questioning by Defense Counsel Abbott, Raupagh testified that it had been his experience that such dealer syndicates usually failed because of too much internal friction.

Two Standard dealers then testified that they had approached Standard in regard to receiving gasoline on a basis comparable to Ned's if they would organize a dealer combine, and that their proposition was refused.

Wrote Chicago

These dealers stated that they had written to Standard's Chicago office outlining the "unfair retail situation in Detroit" and asking that they be given an equal price arrangement to Ned's. Their letters were forwarded to the company's Detroit office.

Abbott then attempted to show, through these witnesses, that Rankin P. Peck, secretary of the Retail Gasoline Dealers Assn. of Michigan and sponsor of the fair trade law, was the instigator of a plan to get all Standard dealers in Detroit to write letters "simultaneously" to Chicago, complaining of the local retail situation. The witnesses both denied that Peck had perpetrated any such plan.

Preceding Raupagh's testimony, Roman L. Miller, of Mt. Clemens, a former Standard dealer, testified that, despite the fact that he had 16,000 gallons storage capacity at his station, Standard would not sell him at tank car prices. Miller wanted Standard to ship to him in transports at less than tank wagon price, but Standard stated that they "had nothing" for him, he said.

Miller testified that he now receives his gasoline from another supplier, the Argo Oil Co.,

Gasoline Price Wars? Yes, Honolulu Has 'Em

N. P. N. News Bureau

CLEVELAND, Aug. 22.—Maintenance of retail gasoline prices by fair trade law is being attempted in Hawaii, a U. S. possession, through legal actions of about the same nature as are being tried in this country, according to the Automotive Sales and Service Stations Assn. of Honolulu.

A. L. Corbett of the association writes NATIONAL PETROLEUM NEWS that the organization has been trying to enforce the Hawaii Fair Trade Act since the passage of the Miller-Tyding bill in Congress last fall.

"That our association has achieved a measure of success in attempting to enforce the Hawaii act is attested by the fact that, since September, 1937, we have entered six complaints against price cutters under the act and have been granted injunctions in each case," Corbett wrote.

"So far only one case has been appealed to the supreme court and it is still in process. Of the price cutters complained against three cases involved association members and three non-members."

The association membership represents a large percentage of the gallonage sold in the Hawaii islands, he stated. He would like information from NATIONAL PETROLEUM NEWS readers as to efforts of retailers' associations in this country to maintain gasoline prices by recourse to the state fair trade laws.

in transport trucks, receiving 1.5 cents off the tank wagon price. He testified further that most all of the major companies in this area had offered him anywhere from 0.5 to 1.5 cents off tank wagon price to get his business.

P. H. Harrison, western regional manager for the Sun Oil Co., supported Miller's testimony, stating that his company and one other were the only majors in the Detroit area who were not selling, or offering to sell, certain retailers at tank car prices.

Other distributors testified that some of their stations were losing gallonage to Ned's stations, allegedly because of the latter's price advantage. Harrison stated that, due to Ned's lower cost per gallon basis, some of his dealers were suffering a loss of business.

T. M. Rinehart, president of the Highland Oil Co., stated that gallonage at some of his stations had dropped off as much as 25 per cent this year, a decrease which he attributed in part to Ned's price advantage.

Detroit Gallonage Less

Defense Counsel Abbott then mentioned the fact that gasoline gallonage throughout the Detroit area had grown steadily lower during the first half of 1938, and asked Raupagh to give an explanation for this decline.

Raupagh gave as his reasons: unemployment, with fewer people driving their cars; competition from unbranded gasolines of cheap and inferior grades and selling for less than major branded fuels; and the improvement in the quality of Michigan gasoline.

Questioned on the cost of handling gasoline in the Detroit area, Raupagh testified that the freight cost by rail from Standard's River Rouge marine terminal to bulk plants in the Detroit area is 0.22 cents per gallon, and that the cost to his company for transporting between these points by contract trucker ranges from 0.00123 to 0.0025 cents per gallon.

Raupagh stated that it cost Standard a total of 2 cents a gallon to handle gasoline at the company bulk plant and haul it to dealers' stations.

Charles Gershenson, of the Ned's company, had previously testified that his cost of handling gasoline at his bulk plant and hauling it to stations totaled approximately one cent per gallon.

According to Raupagh, Ned's is eligible for the tank car price because the arrangement relieves Standard of the expense of storing and hauling gasoline to Ned's stations, plus the fact that Ned's credit condition is satisfactory and its volume is impressive.

'No Intent To Injure'

Raupagh denied that Ned's deal with Standard was consummated by his company with any intent to injure or destroy the business of a competitor.

Standard has not operated any stations in the Detroit area since July, 1936, according to Raupagh, adding that it exercises no control over price at its dealer outlets. He testified that since the so-called dealer marketing plan went into effect, lessees are making much more money than they ever made under a salary operation. Standard's basis for leased station rental involves a minimum cash payment plus a certain amount per gallon, Raupagh explained, in response to questioning by Prosecutor Garber.

Immediately following the hearing, Prosecutor Garber recommended the case be held for trial, but Judge Gordon requested that both sides prepare briefs and submit them to him Aug. 26.

Prices Differ, Charged

Meanwhile, arraignment of Charles E. Austin, Inc., operator of Joy stations, charged with unfair price discrimination and false advertising, was originally set for Aug. 19, but was postponed for three weeks, according to Wayne County prosecutor's office.

Austin's stations last week were flying banners which read — "New Joy — Better Than Ethel". The arraignment, to be heard before Recorder's Court Judge Donald Van Zile, will include charges of selling gasoline at different prices at stations throughout the city. On March 24, according to a survey made in the Detroit area, Austin stations were selling gasoline at prices ranging from 11.1 to 15 cents per gallon.

Austin has long been active in the Detroit area, formerly heading up the Sunny Service Oil Co., another chain of "price appeal" stations.

Three other cases have again been set for examination, all charging conspiracy in restraint of trade and unfair price discrimination. The cases and the dates of examination are: State vs. Gulf Refining Co. and B. F. Goodrich Co. Sept. 12; State vs. The Texas Co. and the B. F. Goodrich Co., Sept. 15; and State vs. the Standard Oil Co. of Indiana and Citrin-Kolb Oil Products Co., Sept. 19.

Warrants were issued against these companies after charges on five counts alleging unlawful conspiracy in restraint of trade. A request for a bill of particulars was granted the companies by Recorders Judge John P. Scallen, and examination of the defendant companies was originally set for June 21.

Soon after the "selling below cost" section of the Michigan Fair Trade Law stumbled in the courts early in June because of an "inadequate" cost survey, the "Save 2 cents a gallon" signs were once more dusted off and placed conspicuously at dealer stations.

Bargain Signs Up

The tank car and tank wagon price reduction of one cent on July 22 only served to bring retail prices from the frying pan into the fire. For it was not long after this reduction that retailers began offering this extra cent as an additional discount, so that in Detroit today it is not uncommon to find signs reading "Save 3 cents a gallon". Some dealers are advertising 7 gallons of regular grade gasoline for $1, which is approximately 4 cents off the "normal" retail posted price. These prices include taxes of 4 cents per gallon.

The dealers' association has just completed a new cost survey (see N.P.N., Aug. 17, page 12), under the direction of H. F. Taggart of Ann Arbor, professor of accounting at the University of Michigan, which will be used in a renewed attempt to legally enforce the fair trade law. This survey shows that the cost of operating a service station in the city of Detroit is 4.8 cents per gallon, and in Wayne County, exclusive of Detroit, 4.6 cents per gallon.

It is expected that prosecutions, using the new cost survey as a basis, will begin soon. Whether or not the fact that this new cost information is more inclusive and is to be used as evidence in the courts will have any effect on the elimination of discounting, remains to be seen.

California Lawsuit Based On Dealer's 'Free' Service

N. P. N. News Bureau

LOS ANGELES, Aug. 20.—Pressing its campaign to clean up retail gasoline markets in this territory, the Retail Petroleum Dealers Assn. has taken up the California Unfair Practices Act as a weapon against stations accused of giving away products, service or other inducements to bring in customers.

As for resale price maintenance contracts under the fair trade law, the R.P.D.A., for the moment, is waiting for the situation to jell. Several major company suppliers have indicated plans for taking positive steps to protect retail prices of their branded products under this law.

This legal weapon was used by the R.P.D.A. last week when it filed suit and was granted a temporary restraining order against W. E. Walgren, Los Angeles station operator.

Walgren Case

In the Walgren case, affidavits accompanying the complaint said that booklets had been purchased—one of them in a beauty shop — which offered $10.00 worth of service for $1.00. It was charged that the station operator did not get even the dollar, let alone make a profit.

Detachable coupons, it was said, were good for the following services: One car wash, value $1; three complete lubrications—two only with oil change—each valued at $1; one battery recharge, including two days free rental, value $1; one pressure flush of transmission and differential, value $1; three puncture repairs, 50 cents each; one spark plug cleaning and spacing service, value 75 cents; and one three-minute tow or service call, value $1.

The first page of the booklet carried the following message: "Mr. Motorist: The money we would otherwise use for advertising we are spending on YOUR CAR. You are herewith offered a sample of our Complete Automotive Service. Pay only one dollar for this advertising service. There are no charges. Not more than one service a day and one book to a car. Good until Jan. 1, 1939."

Law Against Free Service

The complaint was based on two counts. One cited Sections 3 and 16 of the act declaring it is unlawful for any person engaged in business to give, offer to give, or advertise the intent to give away any article, product or service or thing of value.

The second count was based on section 10 of the act, providing that any person, firm, corporation or trade association may bring any action to enjoin a continuous action in violation of sections 1-7 of the Unfair Practices Act, and if, in such action, the court shall find that defendant is violating, or has violated any such section, it shall enjoin the continuance of these actions.

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The Nature of an Oil Business Reflects Abilities of Its Head

It is well known to oil marketers that automobile manufacturers have been trying to show their dealers how to take in extra money and also keep better track of their customers by supplying oiling and greasing service for the cars they sell.

The car makers' efforts have not succeeded as well as anticipated because the auto dealers are primarily automobile salesmen or former salesmen and they think in terms of the large commission on the sale of cars even though few cars are sold in a month. Therefore selling a service for 75 cents does not impress them.

But the auto makers evidently do not despair. Now comes the Cleveland distributor for a medium priced car with quite a story in the free press agent department of the Sunday paper, also known as "the automobile page" telling how he is "revising" his dealer plan for greater Cleveland. It is a "new idea" that he is instituting, of having fewer dealers and, through some unexplained "factory support", going in strong for servicing.

Says this auto distributor about his "new" scheme: "Auto dealers have been spending too much of their time and effort on the wrong end of their business. They have been centering their effort on getting people into their show rooms, when their biggest source of business is the service entrance."

Then again, the other week the group of men who have been the Packard company distributors in north eastern Ohio for 20 years retired. The old crowd had hid a gasoline pump for their own convenience in a dark corner but never once tried to sell from it. The new management put a pump island out in the middle of the big customers' receiving room in their main shop, dolled up a comfortable place for the customers to sit and is making a drive for gasoline business as well as for lubrication.

However, the old group had done a good job at selling "lubricating contracts" to Packard owners for many years, so good a job in fact that the average Packard owner was loath to have any one else attend to his car and he stuck to servicing also every thousand miles despite all the new oil cleaners on the car.

Some years ago the old group, finding so many of their regular Packard owners buying the new Ford 8 for a "second" and a "third" car, finally took on a Ford dealership. They tried to extend the service contract idea on these cars but they found they had drawn a considerable number of only Ford owners who would not spend a nickel more than necessary to keep their cars running, and that many of the Packard owners, no matter how cranky they were about the maintenance of their Packards, did not care much what happened to the cheaper car, so the "service contract" had to be abandoned for the Fords no matter who owned them.

Perhaps these new type of auto dealers, handling other than Packards, Lincolns and Cadillacs, can get their customers to enter into service contracts but our guess is that, unless they duplicate a regular oil company service station in every respect, they are not going to get very far.

Furthermore, there will always be the suspicion in the mind of the car customer returning for a greasing job, that he is going to be "high pressured" to buy a new car, or to have some "repair" jobs done. The Cleveland Packard distributors would not let their service men say a word about a new car, in fact the service department seemed to be almost antagonistic to the sales department in the front of the big building and quite determined to make the old car run so well a new one would not be needed. But such high regard for the feelings of the customer can hardly be expected from the small car dealer and service man who, if he goes in for any servicing at all, will probably be more inclined to overdo his car selling than not.

However, in the long run, the chances are, the character of the individual will determine the character of the business. Some men are good managers and better business men than others. These will do car selling and servicing, even run accessory sales and restaurants, perhaps a general store and sell gasoline besides. Today some good oil men are also selling cars, and accessories and running other enterprises because they are naturally competent and able managers.

I can never forget the experience of a friend of mine years ago when phonographs first came in on any kind of a scale. He became the distributor in a large area for one of the leading phonographs. He found his dealers to be the old time "music store" whose boss and owner was a musician, who traveled with the musical crowd and could play a number of instruments. My friend found they were poor business people, did not know how to sell, to manage a stock of merchandise, to stick to the price or to collect their bills.

In disgust and desperation he finally figured it out that the phonograph was a piece of merchandise and that all one had to do to sell it was to have it in a convenient place, to tell what it would do — give pleasure through playing any music the prospect wanted — to ask the correct price, and to carry through the regular mechanics of making a sale and later servicing the instrument. The result was he searched for men who could manage and paid no attention to whether they knew anything about music or not and few of them ever did really know music. He built up a big organization of dealers who followed him with great success through the heyday of the phonograph, then into radio and later into washing machines, ironers, electric stoves and for all I know they may yet wind up with a gasoline pump and a parking lot.

So it will be with selling gasoline, oil, accessories and cars and food and running sleeping cabins. The man who has the ability to manage a business, to watch the details, will make most any reasonable assortment of these activities go and with a profit, providing he does not get out beyond the extent of his personal capabilities.—W.C.P.

Arnold Suggests 'Public Utility' Status for Oil

(*Continued from page* 9)

gating committee and report is that Berle's recent statement was prepared at the request of Arnold.

That some members of the Roosevelt Administration had ideas of one day exercising control over the oil industry began to appear back in the NRA code days. There were constant reports of a draft of a bill made by the inner circle around Oil Administrator Ickes, that would put the government in charge of the oil business. It has been suspected by many that there was far more behind the government's prosecuting the recent oil cases at Madison, Wis., than just love and affection for the complaining jobbers, especially as the first case meant a doubling back by the Administration on its previous policy toward oil.

While the judge pondered motions to set aside the verdict, the government, it is known, was preparing to go ahead with further grand jury investigations both on the Atlantic and Pacific Coasts and finally it decided on another in the Middle West, for which it called a grand jury and issued subpoenas, when Judge Stone kicked most of the government's case out of court.

Since development of the plans of operation of the monopoly investigating committee and the partial blowing up of the government's first Madison case, the grand jury investigations have been held in abeyance and the new grand jury at Madison dismissed. According to all the reports, it would seem that the Administration is going to make its big drive against oil through the monopoly investigating committee, for the benefit of this fall's Congressional Campaign and the following session of the new Congress which Roosevelt is so confident he will control more than the old one.

Oil, according to the statements of Arnold and Berle, will not be the only industry to receive attention. Berle specifically and definitely mentions the automobile industry saying, "Common sense would indicate some planning of output in the motors field; just as it does in the mining of oil. The market can be estimated; the need is approximately known; a mere senseless over-stocking and shutting down accomplishes nothing." At another point he speaks of the steel industry, copper and "possibly textiles" as being possibilities for government regulation.

Arnold mentions no industry for control except oil and of that he seems to go out of his way to say, "Congress might well consider that the marketing of gasoline has become a public utility." Other than that he says, of industries in general, "we only desire to condemn combinations beyond efficient mass production which have become instruments arbitrarily affixing inflexible prices or exercising coercive power."

Mr. Berle's remarks appeared first last week. They had been prepared—so they were marked—for the confidential information of the O'Mahoney monopoly investigating committee. The story is the committee was floundering and finally Arnold asked Berle to write a memo of how the committee could approach its subject. This Berle did under date of July 12, but a brother Brain Truster who does not care much for Berle, let some of Berle's ideas out to the newspapers so Berle gave out the whole statement.

Berle does a good job of presenting his story, a far clearer and better done piece of work than that of Arnold. However, like so many public officials and those guiding the destinies of our government, Berle either shows considerable ignorance of some of the points he makes, or else is careless with the truth, distorting it—to say the least—in order to get alleged facts to support his points.

Berle's Memo To O'Mahoney

Berle's memo is a plan of procedure for the committee and he sets out the following formula for the committee to use in sizing up corporations and their place in this world:

"Does it (the corporation) provide an adequate supply of goods as tested by the normal market? As tested by the apparent need?

"Does it provide a maximum number of people with an opportunity to make a living under this process—a life under this process—conceived as conditions under which people can live, maintain families, expect to continue in the economic system and end this side of the relief line or the poor house?

"Does it accomplish this process with due regard for the liberty and self-development of the individual?"

To these tests, undoubtedly all oil men would chorus "yes."

Of this approach Berle frankly says: "Such an approach will at least indicate the major successes or, more often, the failures resulting from the existing industrial system. At least, it will end certain illusions which now confuse national thinking. We know in advance that the present productivity of industry, which is so highly regarded and so often praised, is not, in fact, sufficient to meet the aggregate of 'legitimate claims' made against it by labor, by consumers, possibly also by investors, in many instances. But this fact is rarely appreciated."

Then, under the heading of "Some Unwarranted Assumptions," Berle attacks pet ideas of other Brain Trusters and some economists in general. He says that small business is not necessarily competitive, that the small town store, particularly in the day of the horse and buggy, and the village blacksmith and grist mill "were all monopolies."

Then he hands a new bouquet to the oil and automobile industries by saying, "Until the advent of the automobile, they charged conventional prices or administered prices which were not elastic. The people of the village could not go many miles to the next town. In a large measure this is still true in small towns. Such competition as there has been, curiously enough, came from large-scale enterprise; mail-order houses, and later chain stores. The theory that prices were adjusted by competition under the old small scale production in small towns, as far as I can see, simply never was generally true, despite some nostalgic reminiscenses which are indulged in today." And he further lambasts small businesses and their owners as having many "unsocial" characteristics.

Another "unwarranted assumption" is that there is either efficiency or inefficiency in great size. It depends on the men who run the enterprises, says Berle.

Berle then lists 10 alleged government subsidies of business, some of which are subject to considerable question to say the least. He says these should be studied by the committee. He discusses short and long term credit and how, in his opinion, it is easier for large business to get them than small. Then he discusses four subjects under the heading of "The Effect of Large or Small Business on Initiative and Product."

In his discussion of "National Concentration of Power"—to pick out some stray points that will illustrate—he says:

"I have observed that the concentration of power is more likely to come from unity of interest, than from any legal device. This seems almost beyond legal control. You must prevent men whose interests are about the same, and whose minds run along similar lines, from doing about the same thing at the same time."

Yet the Department of Justice at Madison argued that such a state of facts proved a conspiracy in restraint of trade and said it was not necessary for it to show when, where or just in what way the conspiracy had been organized and who had agreed to it.

Then Berle added this thought:

"I think that it would be found that the real desire to monopolize the market, either directly or through alliances, is less an anxiety to make huge profits than a desire to be sure that the concern will continue to exist . . . it by no means follows that some concentration of power may not be desirable in certain industries. I am by no means clear that, in some situations, the controlled cartel may not liberate individuals in the industry a good deal more than uncontrolled competition."

As to the "Evaluation of the Job Done" by a business, Berle says:

"My hope is that the investigation of each industry will wind up with an evaluation of the job done by that industry, rather than, as in the case of previous anti-trust investigations, an assumption that any particular form is or is not wicked."

In discussing "The Claim of Management" under "Claims Against Industry," Berle says: "This claim has never been stated and no one knows what it is. Management wants pay, of course, but it also wants prestige, power, etc. In a word it wants very much what most politicians and people in government want."

In discussing the program of the committee, which Berle assumes, is predicated on some measure of government control, Berle, after paying tribute to O'Mahoney's federal licensing bill as "brilliant" says:

"But unless the reason for the control and the result to be achieved is accurately arrived at, it means very little. The individual licensing corporations would be merely an economic dictator; we should merely replace a more or less management control by a more or less responsible political control unless very careful standards are laid down. A fair criticism of the technique of the New Deal has been that it indulged in shotgun imposition of regulation

'Brain Trusters' Say Oil's Fate Is Regulation,

without adequate definition of standard. The possibility of recapture or perversion of an agency like the Securities and Exchange Commission, for example, gives pause for thought.

"If the argument in this memorandum is accepted, the design of any control undertaken should be to:

"(a) provide more goods, better goods and cheaper goods;

"(b) to provide more jobs, better paying and steadier jobs;

"(c) to provide continuous ready access to capital financing needed to create and maintain additional plants; to provide for the continued development of the arts.

"This diverges from the newspaper approach.

"Where a high degree of competition will accomplish the result, that should be the method used. Where a high degree of cartilization under suitable control will accomplish the result, that should be the method. Where quasi-public ownership produces the result, use that. The answers will be different in different fields.

"Legislating competition (unless all previous experience is worthless) simply does not work. The unit which has the greatest number of governmental privileges accompanied by the best access to the capital market, and the best access to the market and natural resources, will, of necessity, eventually either monopolize or dominate the field.

"If really small scale units are desired, the really effective procedure would be to take away corporate privilege of limited liability. Men who are asked to sign their own names to their own notes will usually be limited by the resulting risk.

"I doubt if this possibility will be seriously considered. During the century in England (1720-1810), when corporations were virtually forbidden, the system worked until the end, but from 1800 on the pressure towards large scale enterprise became unbearable; and the 'Bubble Act' had to be repealed.

"Failing this, it is probably more effective to assist competition, rather than legislate the large unit out of existence. This involves working out a variety of expedients."

One of Berle's expedients is a government credit bank for capital, where every business man can go and borrow his capital wants.

Under control by methods of taxation Berle blows the philosophy for the "undistributed profits tax" so far out of water that one wonders if the Roosevelt administration would ever have the nerve to propose it again, as Roosevelt is reported to be planning to do. Of this taxing monstrosity Berle says:

"The country has been through two or three fights in connection with corporate taxation, one of them having to do with the undistributed surplus tax and another with its modification and attempt to repeal. A courageous investigation of the working of that tax would be worth doing, but (politics and predisposition aside) it is fairly clear how it will come out.

"The undistributed surplus tax was put on under the theory that corporations today could be trusts for the perpetual accumulation — that is, could go on accumulating income and adding it to capital without limitation. This is true. Through compound interest a few corporations could eventually control the whole United States.

"What was not realized was the fact that a high undistributed surplus tax, though it retarded growth of existing large corporations, gave them a perpetual franchise, not only to stay large, but to be the *only* large corporations in existence. No small business could grow up to a point where it could give its large competitors any real battle. In consequence, every small business was in danger far more than the large; and knew it; which was the real reason for the revolt and ultimate modification of the tax. Arithmetically, there could be no other result. Failure to distinguish between investment and holding corporations on the one hand, and operating or producing companies on the other, in which the owner, though he might technically "own" the income, was devoting it to building up a producing unit, frequently in the hope of competing against larger units, made the tax necessarily inequitable. Further, and still worse, the tax left it open to the larger unit to increase the area of its influence through marketing agreements, trade alliances and the like. Thus it did not even prevent the expansion it was designed to remedy. There was a blissful ignorance of the fact that a 'small company' is not a matter of mathematics. A concern with a $75,000 average income might be a large grocery store; but it would be a pitifully weak steel or automobile plant.

"If it were really desired to create a set of competitive units, one of the simplest ways of doing so would be to allow an exemption from undistributed surplus taxes—or possibly even from competitive income tax—until the corporation reached a size equal to, say, 25% of its largest competitor, provided the income were devoted to building plant or paying debts incurred for that purpose.

"The reverse process, of making it impossible for any existing or future small concern to fight a winning battle with the larger concern, whose capital structure and access substantially are already controlled, obviously destroys more competition than it can further."

Mr. Berle also believes, as to patents, that "every invention could be made available to everyone who desires to use it, provided the same royalty is paid."

Under the heading of "Non-Competitive Fields" in discussing control Mr. Berle says of oil:

"There are fields, of course, in which competition does not work out. This is particularly true of transportation; in part also of power; and, in my view, is true of many natural resources, especially oil. The analysis laid down by Professor de Vitti di Marco in his "Public Finance" (Marghet translation) is, I think, the best in print.

"Briefly, that analysis suggests that choice between government or quasi-public ownership and private monopoly turns entirely on the relative efficiency of the two forms of production in taking the product to the need. Where the product is standard and uniform, where the inefficiencies of government ownership are not materially greater than the inefficiencies of monopoly, and where the greater actual use can be developed from public ownership, the public ownership is preferable."

'Regulation Is Dangerous'

Of ordinary government regulation and most men's objection to it, Berle frankly says:

"Regulation is always inherently dangerous; it is often unsound to have government boards making regulations, without assuming the responsibility for the results. The decay of the Interstate Commerce Commission is an admirable illustration. Regulation is always an attempt to generalize and I have yet to see a regulation, either of my own making or of any one else's that fitted the situation. Finally, there is always the certainty that, at some stage in the history of the regulative body, the regulations will be used for purposes which are either corrupt, political, or doctrinaire. Any of these three may produce violent and extremely unhealthy results. A Harry Daugherty running the Securities and Exchange Commission, as at present constituted, or a Whitney running the Federal Reserve Bank, could create a series of interests which would take years to dislodge. Public utility regulations of many states have turned out to be a means of sanctifying privileges, rather than protecting the public."

What Mr. Berle disregards is the fact that many people hold the same fears and doubts of government or political ownership. But under this same heading he gives his most specific recommendations regarding oil, as follows:

"The beneficial side of regulation is this: there are certain fields in which we are not prepared either for monopoly or for public ownership, yet when planning is essential to a secure economy. Here it may well be that some sort of cartel formation or other organization of the industry is essential.

"The fields in which this is true are likely to be these:

"(a) Fields in which the unit of industry is inherently large. This is particularly true, for instance, of the steel industry; certain natural resource industries; the power industry.

"(b) Fields where a planning of output is inherently necessary. This is true of motors, of oil, possibly also of copper. I am not clear about textiles. For instance the motor industry in 1937 undertook largely to increase its output and sales. It did this at the cost of suspending much of its activities in 1938 and causing widespread distress in the Detroit and Ohio area. Had any one of the companies undertaken unilaterally to limit its output, a competing company might—and probably would—have increased its output. Had the four major companies entered an agreement to plan their output, they would have been liable to criminal indictment. Yet common sense would indicate some planning of output in the motors field; just as it does in the mining of crude oil. The market can be estimated: the need is approximately known; a mere senseless over-stocking and shutting down accomplishes nothing.

"(c) A third essential where

Public Utility Status or Government Ownership

the regulative or quasi-cartel system might be appropriate is the dependence of a large number of people on a reasonably continuous flow of the product. Against the obvious interest of the consumer and the theory (delighted in by economists) of an elastic price, there must be set a simple fact. You cannot gamble with the economic safety of a large district simply in the hope that the expansion of inventory will lead to a lower price, which in turn will lead to an expansion. The expansion of industry may lead to a lower price, but this in turn may lead to a spiral engendering the hope of further price cuts, which will stop activity for a period of time, during which an entire district is out of work and all economic processes suffer accordingly. Meanwhile the human suffering occasioned by the stoppage is extreme."

With this last point Mr. Berle rather bowls over some of the theories of his compatriot Professor Arnold, which I shall refer to in a moment.

Further Mr. Berle indicates a belief in and predicts the socializing or organizing under some social plan of entire districts as "working units", much, he says, like the Tennessee Valley Authority, because he believes the steady flow of production and the efficiency of operation can be best maintained in such relatively smaller and local units.

Assistant Attorney General Arnold's contribution to this economic reformation was made over the Columbia Broadcasting System for a half hour the evening of Aug. 19. He discussed "The Anti-Trust Laws, Their Past and Future." But one wondered if he was really discussing anti-trust laws, so much as laying the groundwork for the proposed New Deal economic change to control of great corporations; or if he was laying an alibi against the day that the second pump priming fails, an alibi alleging that the failure was because "monopoly had held its goods at too rigid prices."

It seems to be very easy for Arnold to make assumptions and, when he has made them a couple of times, they appear to him to be facts, uncontrovertible facts. This was the way his two associates operated when at Madison last winter. Whoever questioned these assumptions at Madison was guilty of treason. The outcries would be deafening.

Arnold begins by announcing that the anti-trust laws have been with us for forty years, during which time, he says: "Concentration of economic power, handicaps on small business, exploitation of consumers and piling up huge inventories which cannot be distributed have become our major economic problem."

These are imposing assumptions. Perhaps there is not much question about concentration of economic power but is it any more concentrated, volume of business considered, than it has been for centuries? Some may screech at that but we wonder if there actually is as much concentration?

As to handicaps on small business, we have them and probably always have had them. But may not small business be better off than 50 years and more ago? Look it over and see.

"Exploitation of consumers" depends quite a bit on your point of view. Some times consumers, we hear, think they have been "exploited" by the lawyers. The Department of Justice seems to be contributing to such "exploitation", if anything.

But what catches the eye are the "huge inventories which cannot be distributed." It rather strikes one that the biggest inventories may be those of government in its surplus stocks of farm products, bought to rig the market. Industry seems to get rid of its inventories rather quickly, as is indicated by the automobile factories, steel mills and even the oil industry. The textile and cloak and suit businesses seem to have started up to manufacture the "surplus" stocks that the New Deal is buying through the WPA to relieve the cloak and suit market of "surplus stock." So where are the "huge inventories that cannot be distributed"?

Professor Arnold then asks you to assume that the anti-trust laws have really not been enforced because there has not been an army of lawyers to put to work on them. He says there were only 15 lawyers in the anti-trust division when Roosevelt came into office and that today there are only 90. He calls attention to 2800 lawyers, or just employes, he does not say which, in the Civil Aeronautics Authority and 1200 lawyers, or perhaps just employes he does not say, working for the Securities and Exchange Commission.

Then Professor Arnold indulges in another assumption—at least one wonders what evidence he may have to support the statement—when he says:

'Thousands Of Violations'

"Can we content ourselves with the dramatization of the ideal of competition by an occasional case while thousands of offenses are ignored?" I believe this is the first indication that the Department of Justice has gotten so far behind in its work. Certainly none of the professor's predecessors, even of his own political faith, said anything of this condition. However, says the professor, this "has saved us from the European Cartel system", a system of government relation to industry that the professor's brother Brain Truster, Mr. Berle, is recommending.

Professor Arnold's next point has been made before by no less a New Dealer than President Roosevelt, among others. We probably will hear much more about the inflexibility of prices of manufactured products. Professor Arnold says:

"It is my conviction that we are being forced to abandon our former policy of easy acquiescence and industrial empire building by the failure of great industrial empires to adapt their price policies so that they can distribute the goods which they are capable of making and so they can employ labor and run their plants at capacity. The recent (present? Editor) depression brought home to us the absurdity of people going without goods because inventories of these very goods had become too large. This meant that prices had been fixed without any reference to long range distribution and with an eye solely for short run profit. . . . . In the recent (present? Editor) depression it was not the collapse of financial organizations which confronted us. That problem was already on the way to solution. Instead, we were choked with the inventories which could not be distributed. Production therefore had to stop and men were discharged at a scale new in our history. This was followed by a demand for an investigation of the monopoly practices and price policies which stopped the flow of goods by destroying the purchasing power of consumers and small business men. We are being forced to take control of inflexible price structures and coercions in restraint of trade today just as in 1933 we were forced to take control of the financing and marketing of securities."

Here, it would seem, Professor Arnold undertakes to explain why the administration is seeking more power over industry. The reason for the move is the alleged failure of business to lower prices, so he says, when the collapse comes. A page or two further on he adds another idea in these words that, if big business "were interested in distributing goods, they would lower prices when business expanded in order to run their plant at capacity and to employ more labor."

In other words, Professor Arnold argues that, as inventories pile up, the business man should reduce his prices and then, when the market demand picks up, he should reduce his prices some more so as to increase his output and presumably lower his prices still again. Where the dollars will come from he does not say. We have just quoted Mr. Berle to the effect that this kind of a spiral would be ruinous to all.

Getting down specifically to oil, Professor Arnold says:

"What has happened in this country is that a number of groups have gotten into control of what I have called economic toll bridges which enables them to impose charges on others who have to pass over them to buy or sell their goods. These toll bridges are of many different kinds. Not all of them are illegal, but each of them gives the owner of the toll bridge the power to coerce and to tax others.

"There is the patent toll bridge. A patent is, of course, a legal monopoly given to encourage invention. How far should it be allowed to operate as a source of arbitrary power in the hands of those who never invented anything?

"Another type of toll bridge consists in the sole access to the market being in the hands of a few producers. Take the sale of gasoline. The very existence of the Independent oil companies of America is threatened because the major oil companies stand between them and access to the market. This has happened in a way which is partly legal under our present laws and partly illegal. The major oil companies, by an aggressive sales policy, have acquired so many filling stations that it is very difficult for an independent to obtain a foothold. Then, by nationwide advertising they have created a situation where

the public will not buy gasoline made by Independents unless it is sold under the trade name of a larger oil company. One cannot criticize advertising. Yet no one can deny that the marketing system for gasoline has put the major oil companies in command of an economic toll bridge and a most wasteful one, shot through with unnecessary duplication of filling stations, advertising costs and service costs. The temptation to use this toll bridge to coerce others and to fix prices to turn that waste into a profit is often irresistible. We are now prosecuting major oil companies because we have evidence that they have so used it.

"Such quotations raise this question for Congress to consider. If a monopoly power is obtained by legal means, to what extent should the unregulated exercise of that power be allowed private individuals? If independents could sell gasoline direct to the public, I am convinced that they would have no difficulty in competing. Congress might well consider that the marketing of gasoline has become a public utility. This goes beyond the anti trust laws. Yet I conceive that part of the duty of an enforcing officer is to call the attention of Congress to cases where the laws are inadequate. . . . . Economic toll bridges in private hands should either be abolished or regulated."

Professor Arnold inveighs against "combinations going beyond efficient mass production" and repeats about "thousands of violations" of the anti-trust laws.

What he says as to oil is rather hard to figure out because either his statements are ambiguous or they do not make sense.

What Independent oil companies is he talking about?

The independent oil producer has been complaining of late that the larger oil companies will not buy all the crude oil that he can produce, regardless of whether the market requires the oil or not. If that is what the professor has reference to, then what would he do about it, if he were an oil company and did not feel that his stockholders wanted him to tie up increasing sums of money in crude oil inventories forever, the same kind of inventories the professor himself has been decrying?

If the professor is talking about the independent oil refiner then he certainly is rather late coming to his assistance. The professor's predecessors attacked the major oil companies in court for trying to get prices up, which saved the independent refiner for a few more years. Then, after the legal attack when the tank car market went down and the independent refiners appealed to the Department of Justice to help work out some legal plan for some kind of a marketing agency that presumably would help the independents to get a better price, the department turned a cold shoulder and wanted to know why the independent refiner should exist anyway?

'Wasteful Duplication Of Stations'

The professor complains about major oil companies standing between them—if he means the refiners—and access to their market. When the majors willingly bought a lot of this gasoline the professor's predecessors indicted the majors on the false charge of buying that gasoline above the market price when the government must have known perfectly well that was not true. Now the professor talks about "coercion," presumably complaining that the majors are not paying the independent refiners more for their gasoline than the jobber is.

Then when the professor says the public will not buy gasoline except under a major brand he says what his own outfit at least must know is not true. Some of the strongest and ablest run marketing organizations in the country sell under their own brands and do so most successfully. Then there is a large number of refiners who sell through jobbing and retail outlets that cater to those consumers who through necessity or choice, prefer low prices to brands and even fine looking stations. In fact the volume of sales of these lower priced companies is so great that they have brought on many unprofitable low price periods, such as for illustration today.

It does not appear from the professor's statement that he is complaining on behalf of the independent jobber as he talks about "gasoline made by independents" rather than distributed through independents. However, there are jobbers who have elected to sell major company gasoline and others who would be an ever growing outlet for the independent refiner if a profitable tank car price could be insured.

The professor talks about wasteful advertising and unnecessary duplication of filling stations. While a professor in a college class room exercises wide latitude of theory and generalities, Professor Arnold probably overlooks the fact that, when he left the class rooms at New Haven and took charge of the anti trust division of the Department of Justice, he is supposed—at least by most Americans—to have left theory and generalities behind and now is under an obligation to the citizens of this country to get facts and to stick by the facts, in his talks as well as in his indictments and in his trial work.

If the professor cared for facts and would bestir himself a bit, he would find that behind this advertising that he condemns is a sales service, a sales and business management training that is making the distributors of gasoline more efficient and causing them to operate at lower costs. And if the professor cared to encumber himself still further with facts he would find out that the oil industry is not the only builder of service stations and that there are many factors contributing to the seemingly unnecessary number of stations today, such as unemployment of men, unemployment of real estate, obsolescence of station sites, diversion of traffic and many other reasons.

Heaven knows the country's problems today are complicated enough without confusing them with misstatements of facts where the truth could easily be learned. One of industry's greatest difficulties in dealing with those at Washington today, is the agility in avoiding and even utter disregard that so many there have for the truth. The Department of Justice could have simplified its own work the past several years and could have done justice to several score citizens had it confined itself to the truth.

I do not feel like apologizing for the length of this article, long as it is. Rather I feel an apology would be due the reader if the article were not so long, because then it would not even be a fair attempt to give the reader enough of the statements referred to, to get fairly the picture of what may be before the industry. As it is the statements of Arnold and Berle have had to be cut much and I have endeavored to do the job in a fair way.

The oil industry is undoubtedly reaching a crisis in its relationship to government. Every oil man will be affected by what may happen and he will probably be so affected for all time. There will be no turning back. While the problems may look simple on the face they are complicated and cannot have too much study.

NATIONAL PETROLEUM NEWS will do its best to present the facts on all sides of these problems, that the individual oil man may arrive intelligently at his own opinion as to what is best. To do that kind of a job, it will be necessary to publish what may appear to be long articles and stories, but they will be important to the man who wants to know the facts and have a wise opinion on them. These days one must not only run his own business but study and participate in the national planning as to what his business of the future will be.

West Coast Fuel Bids

LOS ANGELES, Aug. 22.—Bids were opened recently covering approximately 9000 barrels of diesel fuel oil to fill requirements of governmental agencies in Arizona and Nevada during the last quarter of 1938.

Bids of independent plants in the Los Angeles Basin ranged from $1.149 to $1.47 and in the San Joaquin Valley, $1.20 to $1.319. Major company bids ranged from $1.555 to $1.68.

Utah Jobber Enlists In Sales Crusade

CLEVELAND, Aug. 22.—The Paramount Pingree Oil Co., oil marketing company of Salt Lake City, has organized its own "Sales Mean Jobs" campaign, according to A. H. Ehler, president.

"Recently we held a meeting for our sales organization and all service station lessees in Salt Lake City," Ehler wrote NATIONAL PETROLEUM NEWS." The whole plan back of the meeting was to bolster sales and service station maintenance.

"During the meeting, the importance of service station lessees making more personal contacts and canvassing their neighborhoods was stressed. We intend to hold several meetings of this kind during the balance of the year and, by so doing, we feel that we are making more sales and thus aiding in the National Salesmen's Crusade."

The Paramount Pingree company operates nine bulk plants and 38 service stations in Utah and is a jobber of Conoco products.

Pipeline Rate Hearing

WASHINGTON — Interstate Commerce Commission has postponed hearing in crude pipeline rate case from Sept. 14 to Nov. 9.

Three East Texas Refiners Cut Their Crude Prices 15c

(*Continued from page 9*)

fineries in the Mid-Continent, including those in East Texas, have shown no change since the announcement of a lower crude price by the East Texas Refining Co.

Some observers here were of the opinion that the Texas Railroad Commission's pointed hint that the September allowable order might call for the resumption of the five-day week by putting into effect a Saturday "holiday" again, had brought about resistance to a price cut. While a decrease in the quantity of oil available in the field would not meet the objection of some refiners that crude is over-priced, it would have a tendency to relieve the distress well situation in the East Texas field.

Some relief in that direction is reported from the field. The 127 wells connected to the F. H. E. pipeline, whose output has been going to Crown Central Petroleum at Houston under contract, were picked up by three other buying companies Aug. 22, the day before the wells were due to be without market. The Texas Co. was reported to have taken 63 wells, Sun Oil Co., 54, and the American Liberty Pipe Line Co., 10.

Whether the railroad commission would issue its September order this week was uncertain. In one respect it would be bad politics to have the order come out before next Saturday's primary election, with some opposition having been voiced in the past by oil field workers and business interests at further restricting of crude production.

C. V. Terrell, commission chairman, has a run-off contest on his hands with G. A. Sadler. However, the hint given by the commission that Saturday might again be declared a shutdown day, in addition to Sunday, was broad enough and was given enough publicity so that the order itself would occasion little surprise.

"This is an adjustment and equalization to a price which this company can pay for East Texas oil and is in line with prices being paid by large purchasers of crude in other Texas fields and for oil imported into East Texas from Arkansas and Louisiana fields," stated Freeman W. Burford, president of the East Texas Refining Co. in announcing the new price.

"The previous price has caused a reduction in demand for East Texas oil. At the present time this company is unable to find buyers willing to purchase the oil from it, which, together with the low selling prices of gasoline and fuel oil, makes the adjustment and equalization necessary to meet competition from refiners and marketers using oil from other fields and from other states."

The East Texas company, whose 10,000-barrel refinery at Longview was one of the first established in the East Texas district in 1931, has recently been buying approximately 5600 barrels of crude daily. Its pipeline system is connected to 332 wells. Of the 5600 barrels, 850 came from company-owned wells.

Outside Crude Used

Use of crude oil from Lisbon, La., and Schuler, Ark., fields in East Texas refineries recently has amounted to a little more than 5000 barrels daily. The two plants of Hurricane Petroleum Corp. at Overton and Arp, and the refinery of Danciger Oil & Refining Co. at Longview have been using a mixture of Lisbon and East Texas crude and the Premier Oil & Refining Co. plant at Longview, has been running partly on Schuler oil. Deliveries were through the Atlas Pipe Line Co. It is understood that deliveries of Lisbon oil to the Danciger plant ceased this week. Some crude from the Rodessa field was processed in the East Texas company's plant, but none recently, it is understood.

The saving in delivered cost of these crudes over East Texas crude amounted to 35 and 40 cents per barrel and the "imports" have been partly responsible for the lack of a market for a substantial number of East Texas field wells. The number of wells there without a market at the end of this week was 165, to which there is due to be added 125 connected to the F. H. E. Gathering System. The Crown Central Petroleum Corp. of Houston has been taking the oil purchased by this gathering system, about 1500 barrels daily. Crown Central had intended to cease taking this oil July 22 but announced it would continue for one month longer.

Receipts Shifted

In the critical situation which developed in late July, Humble Oil & Refining Co. agreed to take for one month the Longview Gathering System's receipts of about 3000 barrels daily. Longview Gathering is a subsidiary of the Danciger company. It is reported this oil will be handled by the Danciger plant beginning Sept. 1.

East Texas crude moved up to $1.35 per barrel on May 22, 1937. There had been a protracted period of "raiding" of major company connections by local gathering lines which supplied refiners in the field and elsewhere in Texas. The price then was $1.27. The local gathering systems, some newly organized, were paying premiums and bonuses in one form or another ranging up to 7.5 cents per barrel. The eight-cent advance checked the shifting of connections. Since then the situation has turned the other way. Greater competition from lower priced oils left the East Texas independent market on a limb.

There have been offerings of cargo crude in recent weeks at prices substantially below the former f.o.b. price for East Texas oil. A broker was reported to be naming a price of $1.48 on board tanker at the Gulf before the price reduction by East Texas Refining. That would be on the basis of $1.35 for the crude at the well and 13 cents to cover all charges from there on. Normal charges are 12.5 cents trunk line, five cents gathering and 1.5 cents loading, total 19 cents. These are the bare costs, for certain other factors come in. The producer is paid for 100 per cent gross oil but the pipelines deduct one per cent for losses. Then there is the cost of storing at the port while waiting for a tanker to arrive—a variable amount—and some evaporation.

Saturday Shutdown Again?

A hint that a two-day shutdown each week might be restored was dropped by Col. Ernest O. Thompson, of the Texas Railroad Commission, after the statewide hearing on proration had been concluded Aug. 19. The state dropped the Saturday production holiday July 1 but retained the Sunday shutdown.

Figures revealed by commission engineers at the hearing were that the daily average production was 1,413,736 barrels against average allowable of 1,434,974 barrels for the first 18 days of August. The U. S. Bureau of Mines forecast a demand of 1,398,600 barrels for September. So much of the crude production in Texas is on marginal well basis—a statutory minimum of 20 barrels per well per day—that a return to the Saturday shutdown is the quickest way of making a dent in the daily output.

R. H. Foster of the Landreth Production Corp., Fort Worth, asked the commission to restore the Saturday shutdown in West Texas fields until the pipelines were able to take full allowables. In some areas, it is said, about

Roberts Is Named Research Director Of Indiana Standard; Other Changes

N. P. N. News Bureau

CHICAGO, Aug. 23.—Succeeding Dr. F. W. Sullivan, Jr., who has resigned as of Oct. 15, 1938, Joseph K. Roberts is appointed director of research for Standard Oil Co. of Indiana, effective Aug. 15. Roberts will supervise all research activities at the Whiting, Ind., Wood River, Ill., Sugar Creek, Mo., Neodosha, Kans., and Casper, Wyo. laboratories of that company, and will remain active in the work of the Whiting laboratories.

Bruce K. Brown, head of the research, development and patent departments also announces several other changes in personnel. Dr. W. H. Bahlke continues as associate director of research and director of technical service at all laboratories.

Dr. D. P. Barnard is promoted to associate director of research in charge of engine laboratories.

Dr. T. H. Rogers also assumes the position of associate director of research in charge of chemical research activities. Dr. Rogers was recently awarded a gold pin by the company, in recognition of 30 years' service.

M. T. Carpenter is promoted to associate director in charge of chemical engineering work and administrative matters, to handle personnel and business management of the Whiting Laboratory, supervising also the work of cost representatives.

J. H. Forrester becomes assistant director of research in charge of process design and economic analyses, succeeding Carpenter.

Roy N. Giles is promoted to assistant director of technical service on light oils, succeeding Forrester.

Wm. B. Plummer remains as head of the development and patent department, and Pike H. Sullivan as general patent attorney.

Mexican 'Crude' Hits Snag At Houston; Contract Calls for 5,000,000 Barrels

75 per cent of the allowable production is being run.

Through the North Texas Oil & Gas Assn., the Texas Railroad Commission was asked to continue present allowables in the K. M. A. pool, Wichita county, which, like East Texas, has been suffering from lack of a market. Present top allowable is 32 barrels per well, based on 20-acre drilling locations, but the pipelines are taking only 24 barrels. Prospects of additional market outlet was the basis of the request for retention of the 32-barrel figure. The pipelines have cleared up most of the trouble about unconnected wells, cutting the taking and adding more wells to the lines.

Inquiries on crude supply in the K. M. A. field have recently been made by Taxman Brothers, who formerly operated a refinery at Wichita Falls. It is said they plan to repossess the plant, which was sold last year to a Houston salvage company, if they can make suitable arrangements on crude. Construction of a pipeline to the field would be involved.

(*Continued from page* 9)

not know what disposition had been made of the oil whether the federal government is interested, as one report said. "I should think they might be, but I don't know, we do not collect import taxes," he said.

He said no tenders had been sought on another large batch of crude reported to be enroute to Houston, adding that all he had heard about it was the rumor. "It's all very much mixed up," he remarked.

The state requires tenders on all movement of oil, chiefly to keep its accounts on production from Texas fields. It would have no authority to stop imports but can require statements on oil brought into the state. Import tax on crude oil is 0.5 cent per gallon, on gasoline it is 2½ cents.

* * *

NEW YORK, Aug. 23. — Amount of crude involved in Eastern States Petroleum Co.'s contract with the Mexican government is closer to 5,000,000 barrels than the originally-reported figure of 2,000,000 barrels, it was learned today.

First shipment of crude from Mexico under the contract was due to be overloaded in the next day or two from the *S. S. McIlvain* at Houston where Eastern States has a 16,000-barrel refinery.

While Eastern States has stated that the Mexican oil imported oil comes from "unexpropriated" fields in Mexico, some of the American companies, whose Mexican properties were seized last March, have their legal departments looking into the matter.

In Holland, a cargo of Mexican oil was reported seized recently at request of Mexican Eagle Oil Co., claiming that it came from the company's expropriated properties.

Crude Stocks Reach New 18-Month 'Low'

By Teletype
N. P. N. News Bureau

WASHINGTON, Aug. 23. — Crude stocks on August 13 were 286,251,000 barrels, lowest point they have reached since Feb. 20, 1937, when they stood at 287,574,000 barrels, according to Bureau of Mines figures.

The decrease during the week ended August 13 was 1,155,000 barrels, the Bureau reported. Stocks on August 14 last year, nearest comparable date, were 308,737,000 barrels.

Stocks by grade or origin, showing changes, follow:

Grade or Origin	Aug. 13 (Thousands of barrels)	Aug. 6 (Thousands of barrels)	Chg. from Aug. 6
Penna. Grade	6,147	6,114	+ 33
Other Appalachian	1,380	1,407	— 27
Lima-Michigan	1,222	1,317	— 95
Illinois-Southwest Indiana	10,686	19,590	+ 96
Arkansas	2,825	2,960	—135
Kansas	6,293	6,242	+ 51
Louisiana	13,742	13,912	—170
Northern	5,928	6,062	—134
Gulf Coast	7,814	7,850	— 36
New Mexico	7,842	8,186	—344
Oklahoma	80,647	81,127	—480
Texas	96,988	96,726	+262
East Texas	24,260	24,044	+216
West Texas	18,479	18,545	— 66
Gulf Coast	19,634	19,052	+582
Other Texas	34,615	35,085	—470
Rocky Mountain	22,662	22,811	—149
California	32,856	32,798	+ 58
Foreign	2,961	3,216	—255
Total U. S. refinable	286,251	287,406	—1,155
Heavy in California	17,732	17,723	+ 9

'Gas' Tax Receipts

N. P. N. News Bureau

WASHINGTON, Aug. 22. — Federal receipts from gasoline tax in July amounted to $16,264,420, compared with $19,590,748 in July 1937, Internal Revenue Bureau reports.

Such a large indicated decline as this was at least partially attributable to delays in reporting, according to the IRB. April collections showed a 20 per cent gain, it was pointed out. Seven-month collections for 1938 amounted to $106,916,698 compared with $109,620,326 in the same period last year.

At the same time, lubricating oil tax collections for July amounted to $4,784,067, compared with $4,371,623 in July last year. The tax on transportation of oil by pipeline brought the federal government $726,421, in July, compared with $1,105,461 in July a year ago.

Kansas Crude Nominations Are Lower

By Teletype

TULSA, Aug. 23.—Nominations to purchase Kansas crude oil in September received today by the Kansas Corporation Commission at its monthly hearing in Wichita totaled 154,946 barrels daily, a decrease of 5402 barrels from the same yardstick of purchases last month. Independent refiners as well as major buyers who gave a forecast of their demand indicated that they would not require quite as much oil as in August.

Allowable production for August is 165,500 barrels daily and the U. S. Bureau of Mines forecast September demand at 168,000 barrels.

J. R. Reeve Appointed

TULSA—J. R. Reeve, for several years deputy supervisor, U. S. Geological Survey, conservation branch, at Casper, Wyo., has been appointed supervisor at Tulsa. He succeeds the late John M. Alden. For the past year Foster Morrell has been acting supervisor and he will continue as deputy. The Tulsa office spervises operations on leased public and Indian lands in Oklahoma.

'Jack' Rushmore At Tulsa

TULSA, Aug. 20: — F. P. (Jack) Rushmore, zone agent at Denver for Gulf Oil Corp., has been made head of the land and leasing department at Tulsa. He succeeds B. F. Bridges who recently went to Indianapolis to be manager of the newly established offices from which producing and lease operations in Illinois, Indiana, Kentucky and Michigan will be directed.

Valvoline Pipeline Files Suit To Test ICC's Jurisdiction

PITTSBURGH, Pa., Aug. 22. —First court test of the valuations of crude oil pipelines, now being made by the Interstate Commerce Commission, has been filed in federal court here.

It was filed by Valvoline Oil Co., seeking an injunction against the ICC valuation bureau's order directing that the company submit to valuation of its properties.

Valvoline contends that since it now transports only its own oil to its refinery at Butler, Pa., it is not a common carrier. The ICC says it is not necessary that an interstate pipeline be a "common carrier" for it to come under the commission's jurisdiction (See N. P. N., July 6, 1938).

Valvoline has asked that the case be tried by a three-judge federal court. Company attorneys declare that, if necessary, they will carry the case to the U. S. Supreme court.

First Conoco Plant Started In K. M. A.

TULSA, Aug. 20.—The first of three natural gasoline plants built by Continental Oil Co. in the K. M. A. field, north Texas, has been put into operation and the others will be started soon.

Under present restricted flow in the field, the plants will produce about 15,000 gallons of gasoline daily. Full capacity is 40,000 gallons.

The system is designed to process casinghead gas and return the residue to the leases at pressures great enough to repressure the oil sand.

Lisbon Field Crude Takings Are Reduced

By Teletype

TULSA, Aug. 23. — Caddo Crude Oil Purchasing Co., retroactive to Aug. 15, has reduced its taking in the Lisbon field, of north Louisiana, to 75 per cent of the allowable of its connections. The cut will amount to about 35,000 barrels for the last half of the month.

The Caddo company, Groggan Oil Co. subsidiary, has been moving Lisbon crude into the East Texas field, partly for its affiliated refineries and partly for the Danciger Oil and Refineries plant. The reduction in takings is understood to have been caused by the reduction in purchases by Danciger.

Well-Spacing Laws Follow In Wake of Oil Proration

By LAWRENCE E. SMITH
N. P. N. News Bureau

TULSA, Aug. 20.—Like most measures designed to promote stability in the oil industry, the well-spacing question has been a long time on the road and there is no sign to indicate it has neared the goal of solution.

At this time it is of pressing importance in two states, Texas and Illinois; Oklahoma, New Mexico and Louisiana are equipped with statutes which provide that the state regulatory bodies may issue orders prescribing the drilling pattern to be followed in the development of an oil or gas field. In these states it is a question of administration. The Oklahoma law has been sustained by the state supreme court.

Impetus was given to the movement for adequate spacing laws—a term which embraces several other considerations—by James A. Veasey, general counsel for Carter Oil Co., Tulsa, in an address July 25 before the section of mineral law, American Bar Assn. in Cleveland. Aside from the arguments usually advanced for state regulation of drilling units, Veasey broke new ground by asserting what he called the "paramount-industry principle of constitutional law." He expressed this principle as follows:

" . . . . The oil industry is an indispensable one in every state in which it substantially operates. Within the phrasing of the topic under discussion, it is a paramount industry in those states. Accordingly, the proposition is advanced that if, to promote the general well-being of the petroleum industry, and therefore the general prosperity of a state, the legislature should authorize an administrative body to establish spacing units in the oil pools of the state, adapted to the conditions of such pools and at the same time provide a method whereby adjacent tracts might be pooled to accomplish the purpose of uniform well spacing throughout the pool, such a measure clearly is within the power of the state."

Concluding his address, which was one of the most complete studies of well-spacing and uneconomic drilling yet made, Veasey said; "Wider spacing and the preventing of the drilling of unnecessary wells is bound to come, because of the economic predicament of the petroleum industry. It is better that the reform should come through education, enlightened self-interest and voluntary action on the part of members of the industry. If what constitutes an overwhelming economic necessity cannot be met in the manner just indicated, then the industry must resort to the police power of the states to compel the proper spacing of wells and to pool adjacent tracts so that the underlying objectives fully may be attained."

Follow Proration's Course

The hope that proper well spacing may come about through voluntary action in the industry has been abandoned by most oil men. The experience in this phase of stabilization has been similar to that in establishing proration. In a few instances all operators were in accord as to rate of production in a pool, but there usually were some—sometimes only one—who made it impossible to proceed voluntarily. So the police power of the state was asserted in state after state and this was accomplished by years of litigation and legislative mending and tinkering.

It happens that Oklahoma, Kansas, New Mexico and some other states do not have the spacing problems that Texas does. The surveys are regular, the land is owned in rectangles and usually in tracts of not less than 80 acres. It is only when the field happens to take in a townsite that extremely close drilling occurs.

The final phase of the Oklahoma City development, around the state capitol, was partly town-lot drilling, but the city regulated the size of drilling units under an ordinance, compelling the pooling of lots into locations of one city block. Most of the extremely close spacing in the field occurred on subdivisions just outside the city limits where the ordinance was not applicable.

But the town-lot drilling, bad as it is at times, is not the chief difficulty which many oil men seek to have ended. The trouble is an outgrowth of proration and that policy applying in all the states of basing well allowables chiefly on the potential capacity of the well. Proponents of a change contend that a well economically spaced should have greater portion of the available market than one which drains a small tract. The logic of this cannot be disputed.

One operator drills a well designed to drain 10 acres in a field which may produce, say, 10,000 barrels per acre. The reserve upon which this well draws is thus 100,000 barrels. Adjoining this is a tract of one acre on which another operator drills. His reserve is 10,000 barrels, assuming identical reservoir conditions. If these wells are given the same daily allowable, the small-tract well is certain to drain the neighboring ones and to take oil to which it is not morally entitled, no matter what the legal condition may be.

This condition of proration, which is general through the oil states which regulate production, with the exception of New Mexico whose principal fields are divided into 40-acre proration units, has compelled the drilling of hundreds of unnecessary wells. The customary spacing pattern is 10 acres. It was arrived at voluntarily years ago. In many fields the operators would like to drill fewer wells than are called for under 10-acre spacing and, if uniformity could be obtained on wider spacing, drilling costs would be greatly reduced. Frequently, in fact usually, there is objection to departure from the traditional pattern and everybody has to go along to keep up his end under the specific and implied provisions of his contract with the landowner.

East Texas is the classic example of too close spacing. The field has a productive area of about 132,000 to 140,000 acres. There is much engineering and geological testimony in the court and the Texas Railroad Commission records that one well would adequately drain 20 acres. That would mean not more than 7000 wells. Instead, the field has 25,500 wells, not counting those that have been abandoned as uneconomic, and the density is one well to 5.20 acres, using the lower figure on productive acreage.

Well Output Affected

What happened here was the reduction of market outlet to every well. Allowables are based solely on potential production and a well on a tiny wedge-shaped plot is given the same treatment as one on five acres or more, if potential ratings are equal.

Under a 10-acre spacing, with total allowable for the field of 500,000 barrels plus, the average per well allowable of the field today would be better than 70 barrels instead of being slightly more than 20 barrels.

In some Texas fields spacing orders issued provide a recognition of the acreage factor in setting allowables. This is true of the K. M. A. field, in north Texas, where 20-acre spacing is the rule. It so happens that the operators with but a few exceptions sought this plan.

Oklahoma has a spacing law which is applied on the request of operators, but it is of fairly recent enactment and does not touch the fields which constitute most of Oklahoma's reserves. Kansas has no statute on the subject but the Kansas Corporation Commission has made a start at writing spacing orders under its general authority to prevent waste.

(Another article on well-spacing by this writer will appear in an early issue.)

U.O.P. Reduces Cracking Royalty

N. P. N. News Bureau

CHICAGO, Aug. 22.—Drastic reductions in cracking royalties are announced by Universal Oil Products Co., amounting to halving the present rate of 10 cents per barrel of charging stock for cracking heavy oils, also making a new rate of two cents per barrel for reforming gasoline. A 2½-cent rate is charged for cracking at 15 per cent yield, increasing 1/6 cent for each one per cent yield increase up to 30 per cent.

The new rates take effect Oct. 1. A commuted, fuly-paid royalty option is also granted by the new arrangement, whereby Universal may be paid 37½ cents per barrel of annual charge stock throughput, or 75 cents per barrel of raw gasoline producible, as the licensee may choose in written notice.

No recycle stock is included in the royalty calculations; separate tanks and meters must be provided by licensee for recycle stock, or stock which has already been subjected to cracking conditions. In the event any given year's throughput exceeds the amounts used in calculating this commuted royalty, the licensee shall pay for the additional throughput at the current running royalty rates. Gasoline of 400° F. end point by the A.S.T.M. distillation method is the basis for calculating yields.

This is the second general royalty reduction made by Universal, the first being made in June, 1934, when the old 15-cent rate was reduced to 10 cents.

The first refiner signed a royalty and license contract in 1919, it is reported, paying 15 cents per barrel of charge to a 200-barrel unit from which 21 per cent yield of gasoline was guaranteed. Yields of 60 per cent and higher are claimed from Dubbs operations now.

These new rates apply only to pyrolytic non-catalytic cracking, and do not include catalytic polymerization or other U.O.P. processes, the announcement states.

Bureau Predicts Slight Decrease In 'Gas' Demand

N. P. N. News Bureau

WASHINGTON, Aug. 22.—Domestic demand for gasoline in September will total 47,000,000 barrels as compared with 47,245,000 barrels last September, according to the Bureau of Mines.

Last year, the Bureau overestimated gasoline demand in September by nearly 1,500,000 barrels, with the business recession cutting into gallonage. So, this September—even with business on the mend—the Bureau may have "played it safe" in estimating gasoline demand.

If the Bureau's forecasts for gasoline demand in August and September are fulfilled, the cumulative demand figure for the first nine months of 1938 will wind up more than a million barrels ahead of the same period in 1937.

Daily average supply of domestic crude oil to meet market demand in September was estimated at 3,444,300 barrels, or 7 per cent less than in the same month last year, the decrease being due principally to larger estimates of gasoline stock withdrawals, the Bureau said.

The Bureau's estimate is based on this demand being supplied from domestic production, but in recent weeks crude stock withdrawals have run about a million barrels per week—not to mention imports.

Stocks Near '37 Level

A decrease of 3,700,000 barrels in gasoline inventories was estimated for September, which, if the Bureau's calculations for August are followed, would bring gasoline stocks down to about where they were on the same date in 1937.

The report pointed to the high level of distillate and residual fuel oil stocks as "indicating the possibility of a substantial reduction in crude runs in the last quarter."

Adjusting for benzol and natural gasoline, the Bureau figured refinery gasoline production at 46,800,000 barrels which was distributed among refining districts, as follows:

District	Thousands of Barrels
East Coast	6,290
Appalachian	1,630
Indiana-Illinois	8,250
Oklahoma	2,710
Kansas	2,550
Inland Texas	3,890
Texas Gulf	11,750
La. Gulf Coast	1,440
N. La.-Ark.	940
Rocky Mountain	1,170
California	6,180
TOTAL U. S.	46,800

Natural gasoline ratio for September was estimated at 8.5 per cent of refinery gasoline production; gasoline yield, 44.4 per cent; and foreign crude runs, 2,400,000 barrels.

Breakdown of the Bureau's estimated daily demand for crude in September by states, with forecast figures for August and actual production for July, is shown in the accompanying table.

Refiner Loses Suit

TOPEKA, Kan., Aug. 22.—U. S. District Judge Richard J. Hopkins, in what he termed an advance interpretation of law questions, said last week that Derby Oil Co., had no cause of action against Universal Oil Products Co. in the suit for $6,000,000 filed in 1935.

Derby had sued alleging that it had paid higher royalty rate under license to use U.O.P. patents than was paid by certain major companies. Claim was made covering the period 1923 to 1931 and under the Clayton Act three-fold damages were sought.

The case had not been tried. The judge said that the statute of limitations applied. He further said that a license is not a commodity and that Universal therefore was not engaged in interstate commerce and was not violating the Clayton Act.

Bureau of Mines Estimated Daily Average Crude Oil Demand by States

State	Forecast Sept., 1938	Forecast August, 1938	Actual production June, 1938
Texas	1,398,600	1,377,800	1,212,000
California	638,300	649,300	672,300
Oklahoma	528,300	529,700	430,700
Louisiana	255,300	256,100	260,500
Kansas	168,000	169,300	156,800
New Mexico	111,600	112,300	86,900
Wyoming	65,600	62,200	57,200
Michigan	57,000	60,000	54,700
Arkansas	53,700	53,900	42,400
Pennsylvania	47,800	50,100	47,800
Illinois	49,000	45,800	45,400
Kentucky	16,000	14,500	16,200
New York	14,800	15,500	13,900
Montana	14,000	13,900	14,700
West Virginia	9,900	9,900	10,900
Ohio	9,200	10,000	9,500
Colorado	4,600	5,500	4,500
Indiana	2,600	2,300	2,800
TOTAL U. S.	3,444,300	3,438,100	3,139,200

Fewer Plants, Large Units Is Natural Gasoline Trend

N. P. N. News Bureau

WASHINGTON, Aug. 22.—Concentration of natural gasoline producing capacity into fewer hands, and the increase in capacity of individual plants are the keynotes to trends in that industry, judging from the latest report of natural gasoline plants just issued by the U. S. Bureau of Mines, for Jan. 1, 1938.

With 1155 plants reported as of Jan. 1, 1928, the number had dropped to 741 on Jan. 1, 1938. Much of this reduction was due to the dismantling of about 50 small plants in Oklahoma and Illinois during the last two years, the report said.

Texas shows about one-third of the nation's natural gasoline operating capacity, with California having 30 per cent and Oklahoma 20 per cent of the total, the report showed.

Total capacity of plants in the U. S. was slightly over eleven million gallons daily. Half the 1,689,000-gallon increase in capacity in 1936-37 was credited to Texas, where East Texas rose from 425,000 gallons daily to 615,000 gallons; Texas Panhandle plants increased capacity from 1,300,000 to 1,450,000 during this period, in spite of the practical elimination of "stripping" operations in that field.

The largest unit reported has a capacity of 200,000 gallons per day—an absorption unit operated by Phillips Petroleum Co. in the Oklahoma City field. Of the total number of plants, 416 absorption units have 9,430,000 gallons daily capacity; 283 compression plants show 1,012,000 gallons capacity, while 31 combination compression-absorption units can produce 550,000 gallons per day. Eleven charcoal absorption plants are still operating in the Pennsylvania-West Virginia area, with 91,000 barrels per day accredited with capacity.

Natural Gasoline Producing Capacity of Larger Producers, Jan. 1, 1938

Company	Reported Capacity, Gals./day
Phillips Petroleum Co.	1,400,000
Standard Oil Co., Calif.	695,000
Sinclair Refining Co.	430,000
The Texas Co.	417,000
Cities Service Oil Co.	340,000
General Petroleum Corp.	295,000
Shell Oil Co. of Calif.	275,000
Skelly Oil Co.	255,000
Union Oil Co. of Calif.	239,000
Lone Star Gas, and Gasoline Cos.	205,000
Humble O. & R. Co.	203,000
Columbian O. & Gaso. Co.	172,000
United Gas P. L. Co.	172,000
Carter Oil Co.	171,000
Hanlon Cos.	160,000
Magnolia Petroleum Corp.	158,000
Indian Terr. Ill. Oil Co.	150,000
Richfield Oil Co.	130,000
Shell Pet. Corp.	125,000
Gulf Oil Corp.	121,000
Signal Oil Co.	120,000
South Penn Oil Co.	48,000

Pennsylvania Lube Oil Inventories Are Again Reduced, N.P.A. Reports

N. P. N. News Bureau

WASHINGTON, Aug. 23. — The downward trend of Pennsylvania lubricating oil inventories continued in the seven-day period ended Aug. 18, report of the National Petroleum Association today showed.

Stocks of all the major unfinished items decreased. Bright stock inventories were down 100,589 gallons, and of 600 steam refined, 30,530 gallons.

Inventories of 142-180 vis. neutral increased 234,846 gallons, while 180 vis. and above oils were reduced 639,306 gallons, for a net decrease of 404,460 gallons in stocks of viscous neutrals.

Comparison of inventories on Aug. 11 and Aug. 18, as compiled by the N. P. A. from reports of all companies which refined Pennsylvania crude oil, follows:

	Aug. 11 Gallons	Aug. 18 Gallons
1. Raw Long Residuum (Including all raw long residuum below, and not salable, as 600 fire)	2,763,192	2,389,064
2. 600 Steam Refined (Includes all steam refined stock commonly sold or used as 600 and as raw material for bright stocks)	8,306,006	8,275,476
3. Other Steam Refined (Not included in 1 and 2 above)	7,310,432	7,200,624
4. Finished Dewaxed Long Res.	2,343,990	2,204,719
5. Bright Stock (Does not include any material reported in 4, above)	17,603,797	17,503,208
6. Viscous Neutral, below 180 vis. but not below 142 vis. @ 100	7,364,257	7,599,103
7. Viscous Neutral, 180 vis. @ 100 and above	9,565,063	8,925,757

U.S. 'Gas' Stocks Slashed 1,678,000 Bbls. In A Week

N. P. N. News Bureau

NEW YORK, Aug. 23. — Another large drop in the country's estimated total gasoline stocks — 1,678,000 barrels — was reported by the American Petroleum Institute today for the week ended Aug. 20.

Crude runs were cut 30,000 barrels on daily average, the Institute's report also showed, while gas and fuel oil stocks increased 919,000 barrels.

Gasoline production at reporting plants was cut 182,000 barrels, as compared with a stocks reduction of 1,578,000 barrels at reporting plants, indicating a consumption demand much greater than production.

Gasoline stocks were reduced more than 500,000 barrels in both the Indiana-Illinois-Kentucky and the Louisiana-Gulf districts, and East Coast inventories were down 474,000 barrels. Inventories increased in only two districts — the Texas-Gulf district, 206,000 barrels; and the North Louisiana-Arkansas district, 41,000 barrels.

The Institute's estimate of total U. S. gasoline stocks as of Aug. 20 stood at 72,709,000 barrels, or within 2,709,000 barrels of the approximate level which the Bureau of Mines has estimated that inventories will reach by Aug. 31.

The drop of 1,678,000 barrels in gasoline stocks last week was more than double the 811,000-barrels drop which the Institute's report shows of the Aug. 13-20, 1937 period.

Gas and fuel oil stocks continued to soar, reaching another new high of 147,180,000 barrels on Aug. 20.

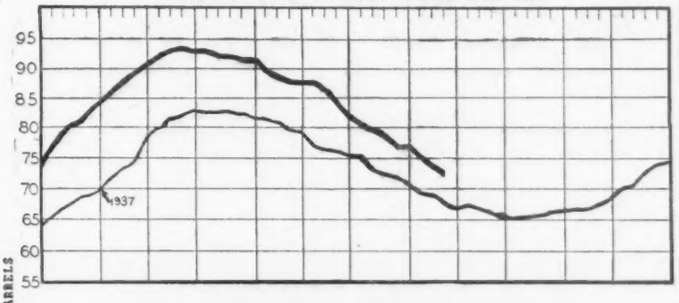
Inventories of light fuels rose 709,000 barrels and the residual fuels were up 210,000 barrels.

California stocks of heavy fuels were reduced 258,000 barrels, the first reduction in that state in several months.

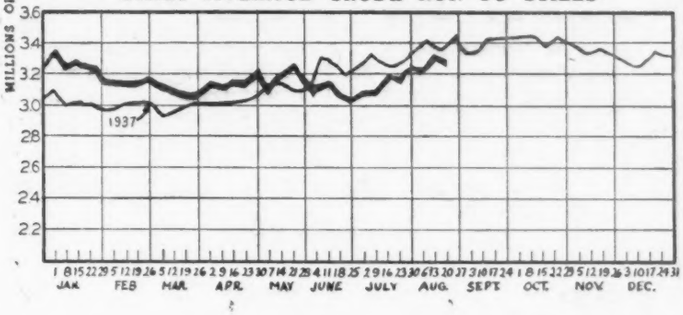
DAILY AVERAGE PRODUCTION IMPORTANT DISTRICTS
American Petroleum Inst. Figures

	Week Ended Aug. 20 Barrels	Week Ended Aug. 13 Barrels
Oklahoma City	123,250	116,450
Total Okla....	443,400	439,600
East Texas....	440,800	440,500
Total Texas...	1,393,650	1,387,850
Kansas	168,100	165,200
Total La.....	261,050	256,000
Ill. (new pools)	47,450	46,200
California	683,300	669,200
E. of Rockies..	2,709,400	2,690,700
Total U. S.....	3,392,700	3,359,900
Crude Imports.	56,280	81,570
Tot. new sup'ly	3,448,980	3,441,470

TOTAL U. S. MOTOR FUEL STOCKS



DAILY AVERAGE CRUDE RUN TO STILLS



New Refining Plant Started In Illinois

N. P. N. News Bureau

NEW YORK, Aug. 22.—Allied Oil Corp. of Illinois is building a 3500-barrel per day topping plant at St. Elmo, Illinois, which will operate on Illinois crude supplied by the Fayette Pipe Line Co. which is building six miles of 4 inch line and 18 miles of gathering lines in the new St. Elmo field.

It was said that the plant would cut naphtha through to heavy fuel, and would not concentrate on any particular product. The St. Elmo crude is gasoline-type oil, according to reports here. The plant is expected to be on stream about Sept. 1 with N. H. Mason in charge.

(The Allied company of Illinois is not connected with the Allied Oil Co. of Cleveland, Ohio.)

A.P.I. Reports On 'Gas' Output

N. P. N. News Bureau

NEW YORK, Aug. 23. — The American Petroleum Institute has incorporated in its weekly reports of U. S. refinery operations, figures covering gasoline production by districts.

No longer will the industry have to wait five to six weeks for this important key to its operations. The only other source from which this information has been available in the past, has been the Bureau of Mines whose monthly reports are not issued until between five and six weeks after the period under survey.

In its first reports, the Institute makes no estimate of total U. S. gasoline production, as it does with refinery crude runs, and stocks of gasoline, gas and fuel oils. The gasoline production figures are confined to actual production as reported by refineries in the various districts. Plants with 89.0 per cent of the country's total refining capacity are currently reporting to the Institute.

All reporting refiners in all districts are supplying their gasoline production figures, the Institute reports show, except the Oklahoma-Kansas-Missouri district. In this district, where plants with 84.7 per cent of the refining capacity are reporting to the Institute, companies owning 10 per cent of the reporting capacity are not reporting gasoline production.

Gasoline production at reporting plants last week was cut 182,000 barrels. Output was reduced in all but three districts, the largest drop being 89,000 barrels in the Indiana-Illinois-Kentucky district.

For detail report of gasoline production see table on Page 23 entitled "Current Refinery Operations."

CURRENT REFINERY OPERATIONS

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills (Barrels) Week Ended Aug. 20	Daily Average Crude to Stills (Barrels) Week Ended Aug. 13	Per Cent of Reporting Capacity Operated Week Ended Aug. 20	Per Cent of Reporting Capacity Operated Week Ended Aug. 13	(a) Gasoline Production Week Ended Aug. 20	(a) Gasoline Production Week Ended Aug. 13	Stocks (Thousands of Barrels) Total Finished and Unfinished Motor Fuel* Week Ended Aug. 20	Stocks (Thousands of Barrels) Total Finished and Unfinished Motor Fuel* Week Ended Aug. 13	Stocks of Gas and Fuel Oil Gas Oil and Distillates Week Ended Aug. 20	Stocks of Gas and Fuel Oil Gas Oil and Distillates Week Ended Aug. 13	Stocks of Gas and Fuel Oil Residual Fuel Oil Week Ended Aug. 20	Stocks of Gas and Fuel Oil Residual Fuel Oil Week Ended Aug. 13	Total Week Ended Aug. 20	Total Week Ended Aug. 13
East Coast	100.0	511,000	486,000	76.4	72.6	1,329	1,411	19,900	20,374	6,248	5,938	8,394	7,873	14,642	13,811
Appalachian	88.4	107,000	103,000	82.9	79.8	399	363	3,119	3,129	235	237	824	860	1,059	1,097
Ind., Ill., Ky.	92.4	410,000	451,000	83.8	92.2	1,692	1,781	11,536	12,071	3,503	3,448	5,831	5,862	9,334	9,310
Okla., Kans., Mo.	84.7	279,000	281,000	72.8	73.4	1,013**	987**	6,405	6,425	1,104	1,119	3,238	3,200	4,342	4,319
Inland Texas	56.6	145,000	140,000	72.1	69.7	582	557	2,102	2,159	407	402	1,593	1,590	2,006	1,992
Texas Gulf	95.7	763,000	768,000	95.7	96.4	2,561	2,610	9,509	9,303	5,271	5,049	7,613	7,681	12,884	12,730
La. Gulf	96.6	123,000	127,000	73.2	75.6	278	307	2,164	2,711	1,230	1,248	2,152	2,135	3,382	3,383
No. La., Ark.	63.7	42,000	42,000	72.4	72.4	125	110	558	517	284	295	572	556	856	851
Rocky Mt.	69.7	56,000	56,000	90.3	90.3	207	212	1,333	1,416	117	119	697	695	814	814
California	90.9	510,000	522,000	68.4	70.0	1,426	1,456	12,423	12,522	10,338	10,193	84,533	84,791	94,871	94,984
Total Reporting	89.0	2,946,000	2,976,000	79.6	80.4	9,612	9,794	69,049	70,627	28,737	28,048	115,453	115,243	144,190	143,291
Estimated U. S. Total (Bur. of Mines Basis)		3,265,000	3,295,000					72,709	74,387	29,427	28,718	117,753	117,543	147,180	146,261

*Includes stocks at refineries, in bulk terminals, pipe lines and in transit.
**10% of reporting capacity did not report gasoline production.

Boerlage of B.P.M. Dies In Holland, Well-Known as Petroleum Technologist

DELFT, HOLLAND—The recent death of G. D. Boerlage, director of the research laboratories of Bataafsche Petroleum Maatschappi (Shell) here takes away one of Europe's best known and most active petroleum technologists.

Dr. Boerlage was best known for his work in developing the test method for ignition quality of diesel fuels, in co-operation with J. J. Broeze, for his researches on combustion in numerous types of diesel engines, and on detonation in gasoline engines. In Europe he was also well known for his work on aviation engineering and on extreme pressure lubricants. One development for which he was responsible is that on engine pressure indicators for research and experimental work.

Born in 1885 in Leiden, Holland, he studied in College Calvin, Geneva, studied law in Amsterdam, and in 1909 worked in a French plane factory, receiving his pilot's license in 1911. In 1912 or a little later he built a monoplane, leaving that work to study engineering in Delft, where he graduated in 1919.

Following a year in Thomassen's Engineering Works, he became a lecturer at the university where he graduated, leaving that position to become director of the B. P. M. laboratories, in which position he was at the time of his death.

John M. McNally

TULSA, Aug. 20.—John M. McNally, 59, Tulsa, division superintendent of Stanolind Pipe Line Co., died at his home here Aug. 12. He came to Oklahoma from Pennsylvania in 1914. His widow, two sons and two daughters survive him.

Clarence Steele

SOUTH HAVEN, Mich., Aug. 22.—Clarence Steele, 54, secretary of Wolverine Service Stations, South Haven, and formerly treasurer of Keystone Oil & Refining Co., Chicago, died recently at his home here. He was with the Wolverine company 11 years. Surviving are Mrs. Steele, a son, James, of South Haven; and two brothers and two sisters.

Herman L. Hensel

TULSA, Aug. 22.—Herman L. Hensel, Sr., 55, died last week at his home in Tulsa, after a heart attack. He had been employed in the production department of Sinclair Prairie Oil Co. and its predecessor Sinclair Oil & Gas Co. for 16 years. He came to Tulsa from Fort Worth 10 years ago. His widow and one son survive him.

IRB Truck Ruling

WASHINGTON, Aug. 20.—Internal Revenue Bureau has ruled that where a company leases trucks and other equipment from the owners and the drivers are under control of the lessee, the drivers are "employes" of the lessee for purposes of the Social Security Act (S.S.T. 307, 1938-29-9455).

Tank Car Price Cut Announced By Sohio

N. P. N. News Bureau

CLEVELAND, Aug. 22.—Effective Aug. 23, Standard Oil Co. of Ohio reduced its posted tank car prices of gasoline 0.25 cent, through Ohio. Its new delivered prices for shipment anywhere in Ohio, excluding taxes are: U. S. Motor, 8.125 cents; above 65 octane number, 8.375 cents.

Effective Aug. 22, the company advanced its posted tank car prices for kerosine 0.2 cent, through Ohio, except in its lowest freight rate area where the advance was 0.125 cent per gallon. New prices are:

Where full freight rates from Toledo does not exceed 0.62 cent per gallon, delivered price is 6 cents; and the following:

Where full freight is:	Price, f.o.b. Toledo
0.63c to 1.15c	5.45c
1.16c to 1.25c	5.40c
1.26c to 1.35c	5.35c
1.36c to 1.45c	5.30c

Last previous kerosine change was a 0.25 cent cut July 8.

Davis Elected President Of Johnston & Jennings

CLEVELAND, Aug. 22. — Robert J. Davis has been elected president of the Johnston & Jennings Co., to succeed Tracy J. Calhoun, who has been elected chairman of the board.

Davis has been a director of the company for the past two and one-half years, and is a grandson of the late Robert Johnston of Cleveland, who was one of the founders of the business in 1884. Hart H. Fleming continues as vice-president of the company.

The Oil Conservation Engineering Co., manufacturer of OCECO Tank Fittings and oil industry specialties, was merged with the Johnston & Jennings Co. some years ago and is now operated as the OCECO Division.

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Albert J. Squier Recovering

PHILADELPHIA, Aug. 22.—Albert J. Squier, president of Squier & Sanderson Co., lubricant manufacturers, is convalescing from a major operation in July. He expects to be released from New York Medical Center in about ten days.

Refining Technology

Water Treatment at Refineries Individual Problem

By ARCH L. FOSTER, Technical Editor

● Treatment of water for the refinery and the natural gasoline plant is divided into two main phases; treatment of the boiler water, and of that destined for process and condensing purposes. Each purpose has its own special problems, and the number of problems is the product of the number of purposes times the number of different types of water found throughout the refining and natural gasoline areas.

Time was when a simple lime-soda treatment sufficed, controlled by the chemist with his burette, his analysis of the raw water and his knowledge of simple mathematical reactions between inorganic ions. In this issue we present an article illustrating an instance of this kind. Given a relatively good process water, low in materials objectionable in refining processes and with no necessity for removing permanent hardness, and lime treatment becomes the only requisite.

The last few years has seen strides made in scientific water treatment for refinery and plant use which in many instances bid fair to put the old, more or less rule-of-thumb methods to shame, when it comes to fitting the treatment specifically to the nature of the individual water and to the individual plant situation. Another article in this issue presents some of the essential facts in the use of organic exchanger bodies for the removal of both cations and anions from boiler-feed waters especially. The author mentions, in discussing the short history of this relatively new development, the use of lignite as an exchange body. Technologists believe that the efficacy of lignite products is due to the presence of humic acids which react in exchange with the dissolved anions, in the fashion of zeolites, the use of which has been general for many years.

Still another investigator uses condensation products of phenolic compounds, aldehydes and acid bodies, forming a product which after use can be regenerated by an acid, replacing a metallic cation by hydrogen without destroying the exchange material. It is observed that in this regeneration, adding hydrogen is not practicable with the conventional zeolite system, where sodium chloride is the regenerating agent.

Lignins, wood, coals, and similar materials may be sulfonated to produce substances called sulfonic type exchange bodies, efficient for the same purposes. Many of these types of products can be used, the technologists say, for treating waters which destroy the older types of zeolites. The chemistry of many or most of them is not yet fully understood, but their application to industrial problems has progressed through epochs since we first attempted to solve the mysteries of water treatment by the phenol phthalein-methyl orange enigma.

No "Cure-All"

Application of colloids to water treatment has also been developed to a practical science. Here tannins and tannic acid, glucosides (normally poisonous to animal life), extracts from plants, including seaweed, are added with excellent results when treatment is suited to the specific case. A number of articles on this subject have appeared in Refining Technology in the last several months and a discussion by two eminent authorities of the chemistry of colloid treatment is begun in this issue to aid in clarifying the chemists' thinking in this not yet well understood field.

Surely the path of the water chemist is no longer a smooth and simple one.

The data on water softening here published for the

(*Continued on page R-388*)

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Contents

Lime Alone Meets Water Treating Needs at Pure's Toledo Refinery **R-386**

Water supply averaging 15 grains of hardness, of which 13 grains are temporary is conditioned satisfactorily with lime treatment and by filtering through fine sand and gravel.

Efficiency of Water Treatment Extended by Organic Type Exchanger Bodies—by P. G. Bird **R-390**

Newer exchange bodies have increased the usefulness and scope of exchange filter processes. The cation exchanger may replace zeolites, may be regenerated on an acid cycle in conjunction with a zeolite softener, and/or may operate in conjunction with an anion exchanger bed.

Heaters for Petroleum Refining—by L. A. Mekler **R-396**

Development of tubular type heaters is discussed, in the light of various service requirements and designs of heaters are shown for specific time-temperature relationships. New type of Equiflux heater is described, in which the tubes are irradiated from both sides.

Activities of Equipment Manufacturers **R-406**

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Water Treating Needs

At Pure's Toledo Refinery

By M. G. Van Voorhis

N. P. N. Staff Writer

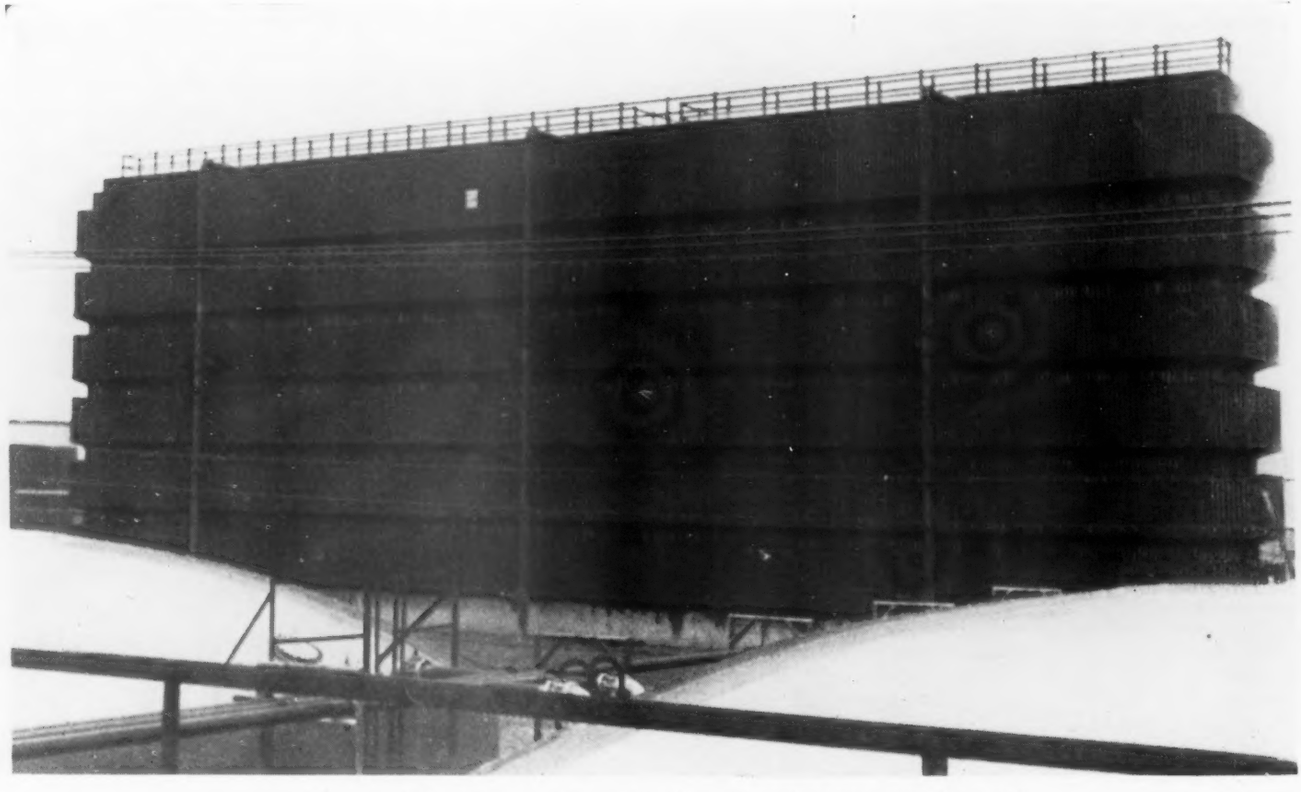
NO ONE who sees the operation of a large water treating plant in a refinery can help but be impressed by the immensity of the cooling tower, if it is of the atmospheric type. While it may be imagined that this also makes an impression with the refinery management, particularly in relation to space requirements and cost, effective treatment with the most simplicity and overall economy probably is most appreciated.

Assuming the truth of these hypotheses, both the disinterested bystander and those most concerned, the owners and operators, can get a kick out of the operation of the plant which supplies process water for the two new combination cracking units at the Toledo refinery of the Pure Oil Co. The fact that a smaller forced draft cooling tower was installed with the newest unit may prove the management's concern with saving ground space at the plant.

Consisting essentially of treatment with hydrated lime only, followed by filtration through sand and gravel filters, this water treating system consumes roughly 430 pounds of lime per day to remove two grains of "temporary" hardness from 250,000 gallons of raw water. This is equivalent to about 12 grains of lime per gallon. Water supply is drawn from Maumee Bay and supplied by a pumping station of the adjoining Standard Oil Co. (Ohio) refinery. It has an average hardness of 15 grains, 13 of which are "permanent" and not removable by the lime treatment.

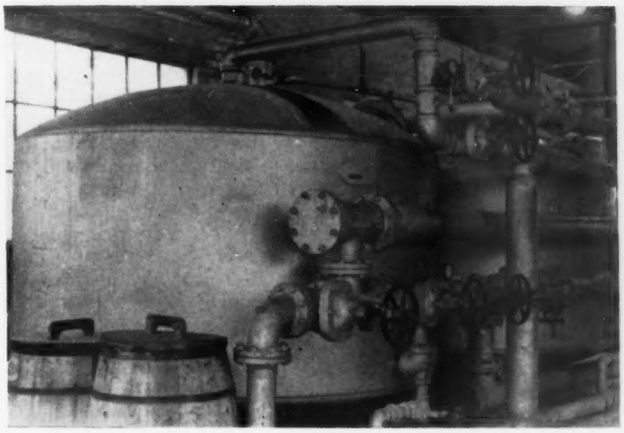
The range of hardness throughout the year is from 10 to 30 grains, the greatest hardness appearing in winter. Since the "permanent" hardness does practically all of its damage above 250° F., while the temperatures encountered in refining applications never exceed 210° F., it is unnecessary to remove this hardness. Until recently an alum treatment only was used to produce flocculation but better results are being experienced with the lime treatment.

The raw water is normally alkaline but this alkalinity

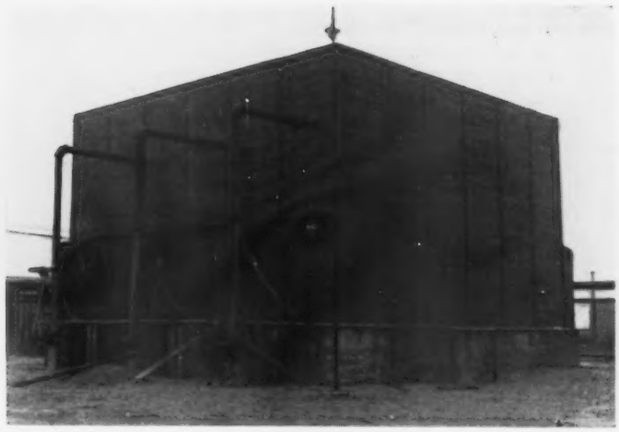


The atmospheric cooling tower is 150 feet long and 50 feet high and is 18 feet wide

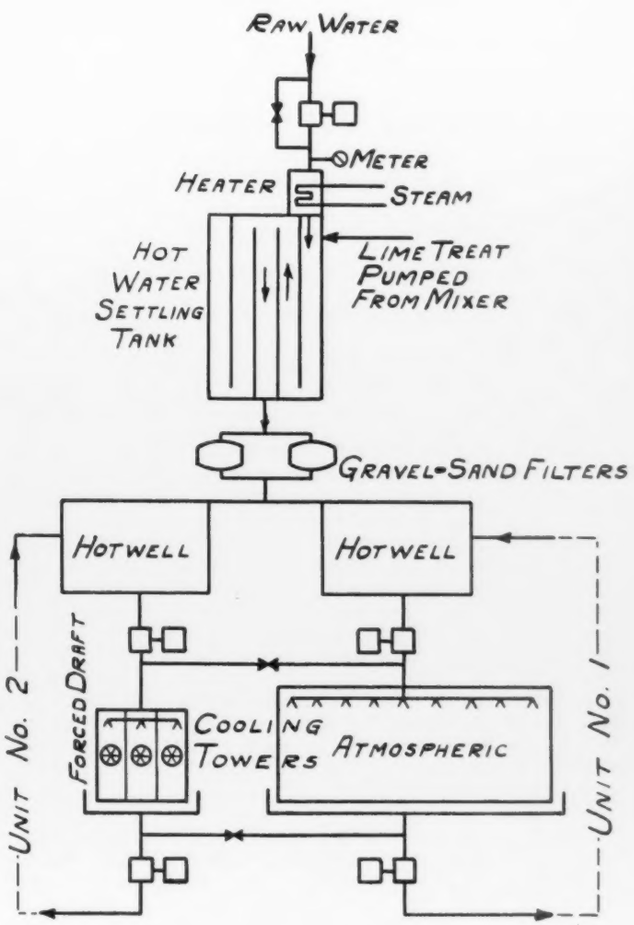
Filled by Lime Alone



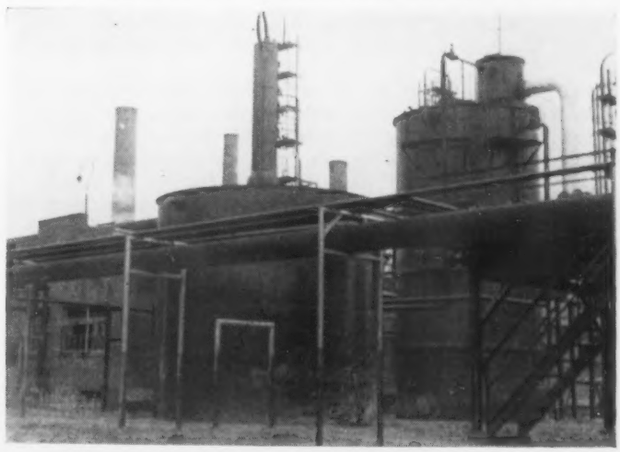
Two sand and gravel filters are operated in parallel to filter 250,000 gallons of lime-treated water per day at full load. They have an even greater capacity



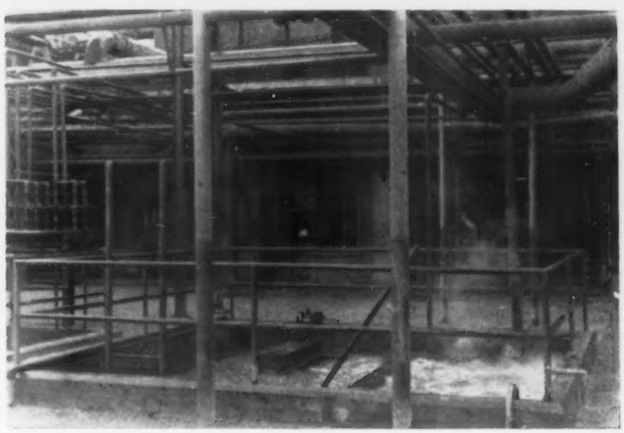
The forced-draft cooling tower is idle during a routine shutdown of the new No. 2 combination cracking unit. The structure is 46 by 50 feet and 30 feet high. Contrast this with the dimensions of the atmospheric cooling tower. Three similar fans are on the opposite side



Flow chart for the water treating system of Pure Oil Co. refinery at Toledo showing only a portion of the details. Manifolding permits considerable flexibility in the use of hot wells and cooling towers



Flocculation of lime-precipitated water hardness takes place in the 50,000-gallon tank at the extreme right after water passes through the steam heater shown on top of the tank. The filter house is shown at the left, with No. 1 hot-well storage tank in the center of the picture



No. 1 hot well, in front of the filter house, holds 7500 gallons. An overflow skimmer is shown near the center of the basin

is further increased to a pH of 9.8 by the lime treatment. The treatment is so controlled that alkalinity may be expressed as twice the phenolphthalene equals the methyl orange alkalinity (2P = M). This is a standard titration test indicating that the water contains no caustic nor bicarbonates and that the alkalinity is all produced by normal carbonate ($CaCO_3$). Purpose of the treatment is "to obtain chemical equilibrium in the circulation system so that the water is 'saturated' and no scale is deposited or removed."

High content of suspended clay in the raw water calls for close attention. If allowed to remain in any quantity it complicates the treatment by acting as a stabilizer for oil-water emulsions. The efficient removal of suspended matter is accomplished, along with the lime-precipitated hardness, by two gravity type filters with gravel and fine sand beds.

The filter beds are cleaned every four hours by backwashing or reversing the water flow through the filters at the rate of 500 gallons per minute. More thorough cleaning is scheduled at two-month intervals. The filters consist of two vertical cylindrical tanks with rounded top and bottom, having a diameter of eight feet and a height of seven feet. They have a 150-gallon-per-minute capacity and can withstand a pressure of 59 pounds. Filters are housed in one of three buildings provided for water treating equipment.

Water is received by the plant at pressures varying from 10 to 30 pounds per square inch. A booster pump is employed if pressure is below 25 pounds. Water is first heated to 150° F. by two-pound exhaust steam in a heat exchanger located on top of a 50,000-gallon hot water settling tank into which it then passes. The settling tank is of concentric cylindrical construction, so that water passes first downward next to the outside shell along with the lime solution which is also added at the top of the tank. The mixture passes upward again and then down and out through a central pipe to the parallel-connected filters.

The filtered water is divided. One portion passes to a hot well normally used with combination unit No. 1, completed last year, and the other portion passes to another hot well normally used with a combination unit just recently put in service. Hot well for No. 1 consists of a 7500-gallon concrete basin below ground level and a 46,000-gallon tank. The hot basin for No. 2 unit is a 55,000-gallon concrete basin. Skimmers are provided in both basins to remove oil from the water surface.

Pumps send filtered water from No. 1 hot basin to a six-tier atmospheric cooling tower. For Unit No. 2 a forced draft cooler has been installed. Although normally one hot well and cooling tower serve the same combination cracking unit, flexibility has been provided by manifolding so that any combination may be employed with either unit. The six-tier atmospheric tower is far larger than the forced draft tower. Its dimensions of 150 by 18 feet and 50-foot height compare with forced draft tower dimensions of 46 by 50 feet and 30-foot height. Both types have advantages however.

Forced draft in the newest cooling tower is provided by six fans, three on each of two opposite sides of the tower which force air upward against the downward flow of water sprayed from 360 nozzles near the top of the tower. Exit for water vapor and air is through the top of the tower. The six-blade fans, 10 feet in diameter, are driven by 20-hp. motors by triple V-belts at 600 r.p.m. The tower consists of three "cells," any two of which are capable of carrying the full load. A treatment of six pounds of copper sulfate per day in the basins of each cooling tower prevent algae growth.

Refinery equipment receiving water supply by pumps from the cooling tower basins includes open condenser boxes, heat exchangers, pump jackets, and some is used in treating distillates. Pumps for Unit No. 2 are housed in the basement of a new building in which a boiler water treating system is to be installed. The pump circulating water from the cooling tower to refinery equipment has a capacity of 4500 gallons per minute and is powered by a 125-hp. motor. A spare for the same purpose has 4000 g.p.m. capacity and is driven by a 96-hp. steam turbine. Pump for hot well to cooling tower has a dual turbine and motor drive and a capacity of 4500 g.p.m. Water lines for this unit are 16-inch.

Pumps for unit No. 1 are installed in the basement of the filter house. The circulating pump has a capacity of 4000 g.p.m. and is driven by a 75-hp. motor. The spare is turbine driven and has a capacity of 3500 g.p.m. Two hot well pumps are provided: one electric driven and the other by steam turbine. A spare is also turbine driven. All lines for unit No. 1 are 12-inch lines. The supply line booster pump is also installed in the same room.

Routine tests are run every two hours to determine the P to M alkalinity ratio (2P-M), the pH value, turbidity, and hardness of raw water, and of treated make-up, and circulated water. A water treating report is filled out each day with this data. The alkalinities are obtained by simple titrations. Standard pH tests are made, colors being matched with color discs, corresponding to standard solutions. Hardness is determined by the standard soap test, in which a measured amount of a known soap is added until a foam is formed which will last two minutes.

A certain amount of scale formation is unavoidable in this system, although corrosion is effectively prevented. Scale formation may be observed visually from time to time and can be eliminated when necessary by a careful application of sulfuric acid to the system in a very small concentration.

The boiler water treating system, previously mentioned, will be installed to take care of water for a new steam plant, soon to be installed. Present steam requirements are purchased. To meet the more exacting requirements of boiler water supply, a zeolite water softening unit will be added to the present water conditioning plant, which will demand about 2000 gallons per hour and will increase the raw water requirements about 20%. The new treating unit will take its supply from the present source and will be otherwise independent of circulating water systems. Since the capacity of the water supply system is about double the present demand, it is more than capable of taking the additional load.

Water Treatment At Refineries

(*Continued from page R-385*)

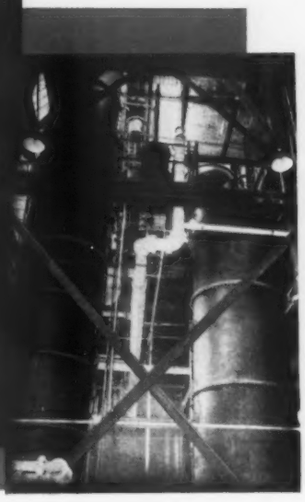
first time is by no means exhaustive, but is worth the study of any ambitious plant operator attempting to lower his costs or improve the quality of the water he must use in the plant.

The layman probably does not realize the tremendous quantities of water used by the petroleum industry. California's natural gasoline industry alone is using 552,000,000 gallons of water per month for steam generation and cooling, to produce a matter of 50,000,000 gallons of natural gasoline, or eleven gallons of water per gallon of gasoline, an authority there estimates. This enormous quantity would fill a tank a third of a mile square and 20 feet deep; a year's supply would fill the same tank built up to nearly a hundred yards in height.

Careful estimates of refinery water consumption have not been made for the whole country, but a conservative estimate of five gallons of water per gallon of crude processed would require four to five billion barrels of water to run the country's refineries a year. Treating this water for temporary hardness alone would cost hundreds of thousands of dollars a year; removing sulphate hardness, organic matter, suspended matter and foma producing solids would multiply the cost several times in most cases. This figure probably errs seriously on the conservative side.

The water chemist or the plant chief has his hands full, with attempting to determine which of the many good systems for treating water is best for specific conditions at his plant. The technologists who have developed these processes and who apply them to a problem only after careful analysis and study of the individual difficulties, have contributed largely to the solution of one of the refiner's most bothersome perplexities.

TURNING PETROLEUM INTO CHEMICALS



To some operators of refineries the production of chemicals is of more importance than that of gasoline, naphtha, lube-oils, etc. To such concerns with plans for new projects in the immediate future, it may be of interest to know that Badger's engineering staff is really two-phased. One division, consisting of experienced petroleum refinery engineers, collaborates with another division skilled in the broad scope of chemical processing.

If turning petroleum into chemicals is becoming increasingly important, then it is equally important that a staff of petro-chemical engineers be given the responsibility of design and construction.

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Efficiency of Water Treatment Extended by Organic Type Exchanger Bodies*

By P. G. Bird[1]

Presented at the forty-first annual meeting of the American Society for Testing Materials at Atlantic City, N. J., June 27-July 1, 1938 under the title, "Removal of Dissolved Salts from Water by Exchange Filters".

ABSTRACT

The newer organic types of exchanger bodies as applied to water treatment for the complete or partial removal of dissolved salts are discussed. The methods of using these exchanger bodies is described for affecting various types of exchange with the results which should be expected from these materials.

The cation exchanger body may be used to replace zeolites and are advantageous in that respect for waters which cause disintegration of zeolites. The cation exchanger may also be regenerated with an acid and operates in the acid cycle. After regeneration it is possible when operating in conjunction with a zeolite softener to effect partial reduction of the dissolved solids equal to the carbonates or bicarbonates present in the water. The acid regeneration also makes it possible when operating in conjunction with an anion exchanger bed to pass the water through the beds in series to effect practically complete elimination of dissolved solids, except silica.

THE removal of dissolved salts from solution, including sodium salts by means of exchange filters is a relatively new practice. As there are only a few such plants in operation, relatively little is known about the process, except by those who have had these units under observation.

To effect practically complete removal of dissolved salts from water, the water is passed through two filter beds arranged in series. The first bed, known as the "cation exchanger bed", removes the positive ions, or cations such as those of calcium, magnesium, and sodium. The second bed removes the negative ions, or anions, such as the chlorides, sulfates and nitrates and is referred to as an "anion exchanger bed."

The carbonate ions, or CO_2, which enter the system as bound CO_2 in the carbonates and bicarbonates of the raw water are not removed in either bed, but are released by aeration after the water has passed through the system

For convenience, the exchangers used in this process are placed in two classifications. The first class of exchange body exhibits the property of cation exchange. The zeolites, which are characterized by being siliceous in nature, constitute one type of this class. There are several kinds of zeolites in commercial use, including both processed natural zeolites and synthetic zeolites.

Another type of cation exchange body is characterized by being organic and non-siliceous, rather than inorganic and siliceous. These non-siliceous organic exchange bodies may be further classified according to the nature of the raw materials from which they are derived and the method of manufacture employed in producing them.

Borrowman[2] was one of the first to employ the non-siliceous exchange bodies for water treatment. He used lignite coal as a substitute for zeolites. The materials described by Borrowman were regenerated with salt and operated in the sodium cycle. He pointed out that the activity of lignite was probably due to the humic acid and related acids present in lignite. As humic acid has organic carboxyl groups, the lignites may be classed as a carboxyl cation exchange body.

Adams and Holmes[3] and others described cation exchange bodies made by condensing phenolic compounds with an aldehyde and acid. Akeroyd and Broughton[4] believe that the activity of these exchangers is due to the presence of phenolic hydroxyl groups, and that the exchange of cations takes place on these groups. The phenolic cation exchangers may be regenerated with an acid, or in other words, hydrogen ions may enter into the exchange without destruction of the exchange body. This has not been practical with the siliceous cation exchangers or zeolites.

Another type of organic exchange body is characterized by the sulfonic groups. Burrell[5] states that these bodies may be produced by sulfonating lignins, wood, coals and similar substances by treatment with sulfuric acid. He has also described a method of testing these materials. The exchange capacity of organic substances may be increased by sulfonation, or may be imparted to bodies not previously having appreciable exchange capacity by sulfonation. This group is referred to as the sulfonic type of cation exchange body.

In these three general groups of cation exchangers (carboxyl, phenolic hydroxyl, and sulfonic) products ranging from high capacity exchangers having good physical properties to practically worthless materials may be found.

Cation Exchangers Replace Zeolites

Many of these organic exchange bodies may be used in place of zeolites to soften water when salt is used for regeneration. These products are advantageous when used for treating water which is known to, or is likely to, cause destruction of siliceous zeolites.

As the industrial use of such products is relatively new, standards of exchange capacity, physical properties, and

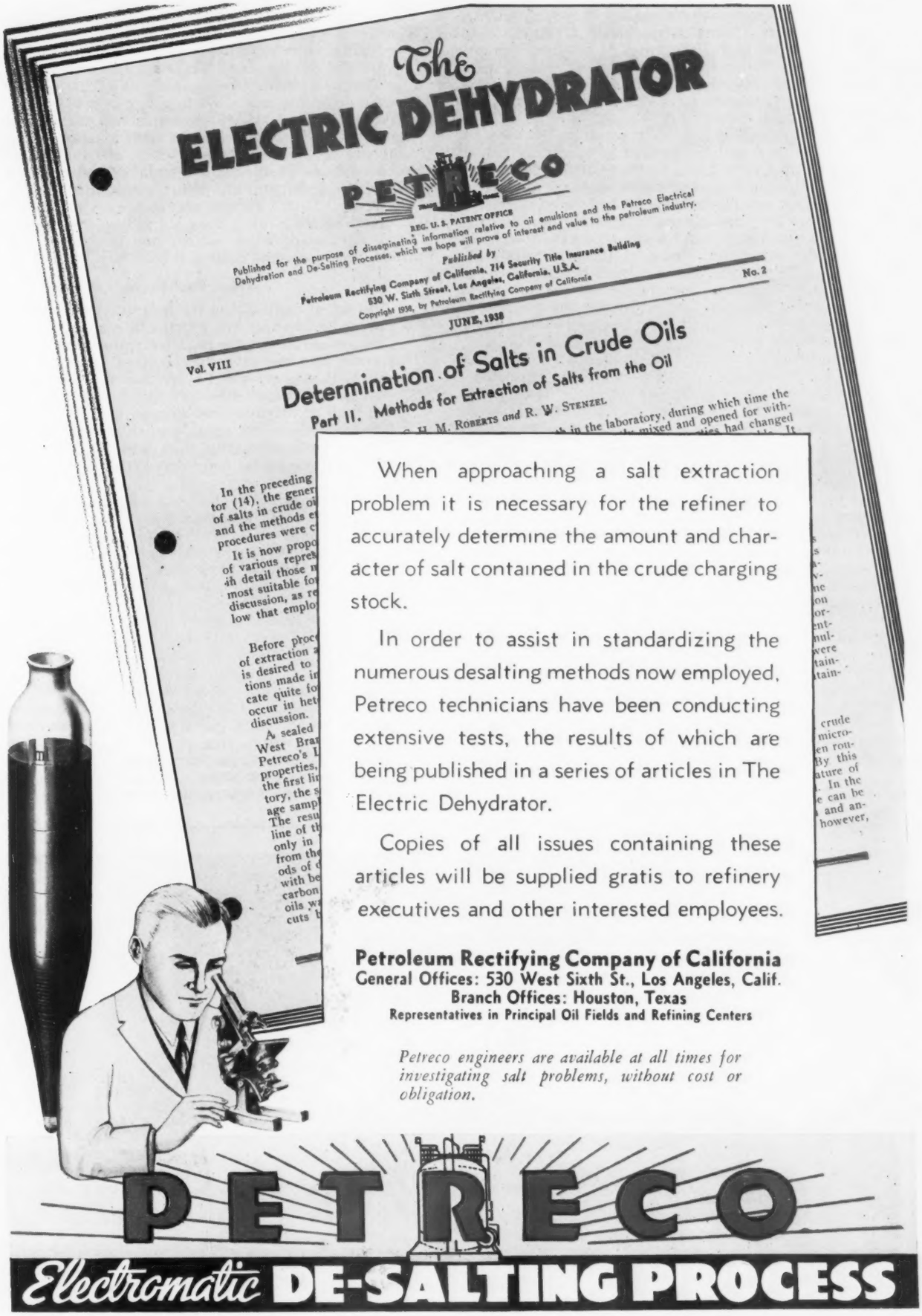
[1]Research Director, National Aluminate Corp., Chicago, Ill.

[2]G. Borrowman, "Water-Purifying Material and Method of Preparing and Using the Same," U. S. Patent No. 1,793,670 (1931).

[3]B. A. Adams and E. J. Holmes, "Adsorptive Properties of Synthetic Resins," *Journal*, Soc. Chemical Industry, Vol. 54, No. 1, p. 6T (1935).

[4]E. I. Akeroyd and G. J. Broughton, "Alkali Adsorption by Synthetic Resins," *Journal of Physical Chemistry*, Vol. 42, p. 343 (1938).

[5]H. Burrell, "Organolites—Organic Base-Exchange Materials," *Industrial and Engineering Chemistry*, Vol. 30, p. 358 (1938).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JUNE, 1938
Determination of Salts in Crude Oils
Part II. Methods for Extraction of Salts from the Oil
H. M. Roberts and R. W. Stenzel

When approaching a salt extraction problem it is necessary for the refiner to accurately determine the amount and character of salt contained in the crude charging stock.

In order to assist in standardizing the numerous desalting methods now employed, Petreco technicians have been conducting extensive tests, the results of which are being published in a series of articles in The Electric Dehydrator.

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other characteristics have not been set. When used as zeolites, they should at least meet certain standards met by zeolites, unless other considerations are more important.

Zeolites require approximately one-half pound of salt for regeneration for each 1000 grains of hardness removed from the water. Many zeolite installations require somewhat more salt than this, and some successfully use less. Organic exchangers should meet this standard of salt consumption when used as zeolites.

Wash water requirements vary considerably with the kinds of zeolite used and the method of operation, but ordinarily should not exceed 35 gallons per cubic foot of exchanger bed for organic cation exchangers.

These organic substances may not be treated as zeolites in all respects. They are generally lighter in weight than zeolites and consequently require more freeboard with upflow than zeolites require. Some of these materials are so light that a 75 per cent bed expansion is experienced at an upflow rate of 7 gallons per square foot per minute, as compared to a 13.5 per cent bed expansion for a synthetic zeolite graded on the same screens. Designers must necessarily take this into consideration.

Whereas siliceous zeolites may impart silica to water, some of these organic exchange bodies will impart soluble organic matter, as well as tastes and odors to water. This disadvantage has been recognized[6] and efforts to stabilize such products have been made.

Acid Regeneration

The phenolic hydroxyl and sulfonic cation exchangers may be regenerated with acids. Sulfuric acid is generally preferred because of its lower cost. When these bodies are regenerated with acid, and water containing dissolved salts is passed through a bed of such material, the positive ions of the salts are exchanged for hydrogen ions and are retained in the exchanger bed. The result is that the effluent is free of sodium, magnesium, calcium, and other positive ions, except hydrogen. The effluent bears acids rather than salts. The carbonates, chlorides, sulfates, and nitrates in the raw water are converted to carbonic, hydrochloric, sulfuric and nitric acids, respectively, and these acids are present in the effluent in amounts chemically equivalent to the salts in the raw water. When the exchange body is exhausted, the amount of acids in the effluent will decrease, and this decrease will be accompanied by a corresponding increase in salts. The first salts to appear will be sodium salts with calcium and magnesium salts being retained. An analysis of the effluent will show that the sodium salts may exceed the sodium salts in the raw water, indicating that after the exchanger bed is exhausted as a hydrogen exchanger it will function for some time as a zeolite, and that the sodium absorbed while acting as a hydrogen exchanger has put the bed into condition to act as a zeolite.

The acid effluent from the cation exchanger is further treated according to the use to which it is to be put. If desired, the mineral acidity (hydrochloric, sulfuric and nitric acids) may be neutralized by suitable alkalies, raw alkaline water, or zeolited bicarbonate water, and the carbonic acid removed by aeration. The net result of such a process is to reduce the carbonates and bicarbonates or alkalinity of the raw water. Such a process results in only partial reduction of dissolved solids as it does not reduce the chlorides, sulfates, nitrates or silica content and may leave the water acidic, unless careful control is exercised.

Anion Exchangers

Instead of neutralizing the acid effluent it may be sent to a second exchanger bed which will remove the acids. In this class of exchanger the negative, rather than the positive, ions enter into the exchanger process. This class of exchange body was described by Adams and Holmes[3] in 1934. Those products were resins derived by condensing aromatic amines with an aldehyde and an acid.

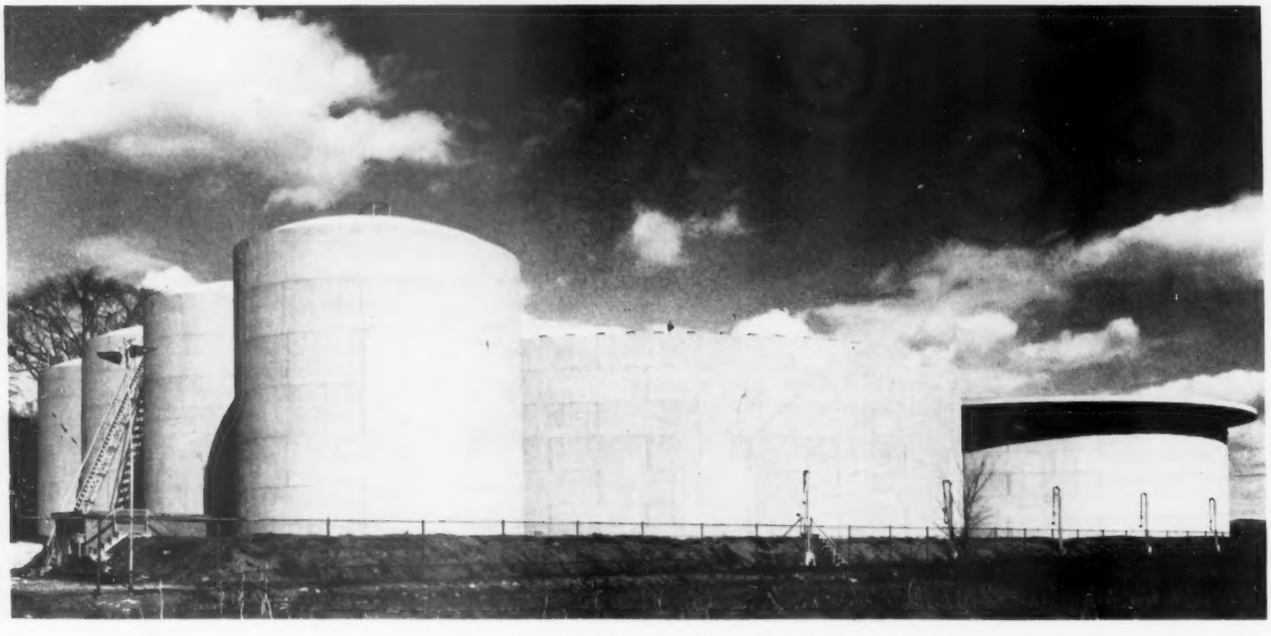
Other methods of preparing anion exchange bodies, other than by condensation have been suggested, such as halogenating a suitable body and following this by amination.

The anion exchange bodies examined appear to have very little capacity for carbonic acid, a good capacity for hydrochloric acid, and a still higher capacity for sulfuric acid. A high-grade anion exchange body will have a capacity greater than 6000 grains per cu. ft. for hydrochloric acid, and greater than 15,000 grains per cu. ft. for sulfuric acid.

The entire process of removing all dissolved salts from water consists of passing water through a bed of cation exchange bodies to remove the positive metal ions, and then through a bed of anion exchange bodies to remove the acid or negative ions. The effluent from this two-stage process will contain carbon dioxide equal to the bicarbonates in the raw water, which gas is later liberated by aeration.

The effluent will be free of sulfates, calcium, and magnesium and will be substantially neutral if good liberation of carbon dioxide is obtained. The residual carbon dioxide should not be over 15 parts per million. An atmospheric

[6]H. L. Tiger and P. C. Goetz, "Stabilizing Base Exchanging Humates," U. S. Patent No. 2,069,564.



Battery of tanks vapor-connected to a single balloon roof, on tank at extreme right, to reduce storage losses

WATER STORAGE TANKS STANDPIPES and FILTER PLANTS

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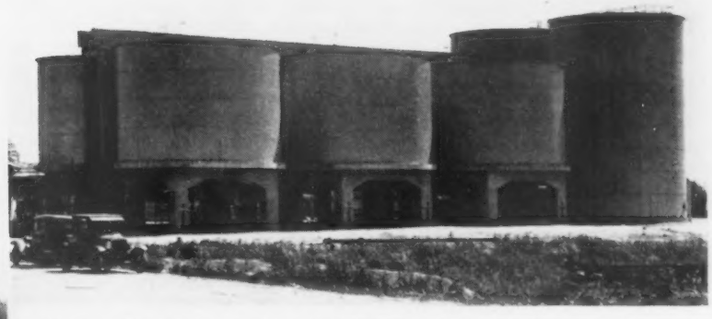
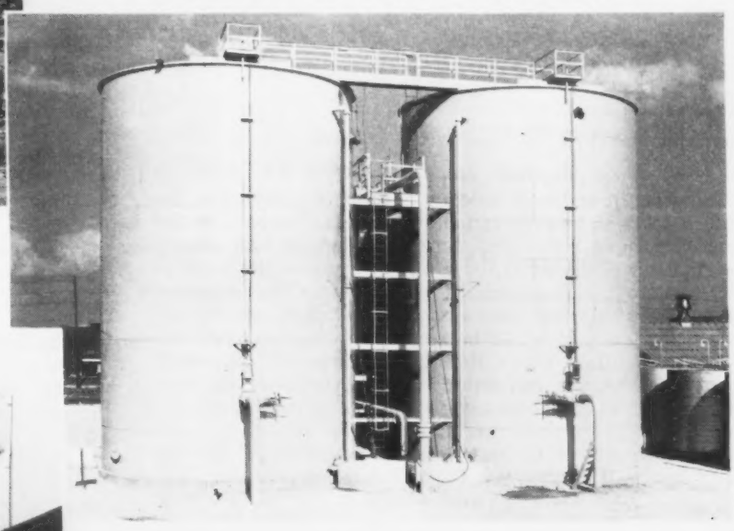


Above: Close-up of the six 163,000-gal. flat-bottom tanks and the two 340,000-gal. standpipes.

Below: View shows the two 340,000-gal. standpipes used for storage.



Above: General view at a steam plant serving a Louisiana Refinery showing a 200,000-gal. elevated tank, several flat-bottom storage tanks, and two large standpipes.

Above: The Morse Filter Plant is noted for its ability to handle large capacities in a small space. The unit shown here occupies an area of only 50 ft. in diam., and has a capacity of 1,250,000 g.p.d. Send for the new Morse Filter Plant Bulletin.

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type of aerator will leave the water saturated with oxygen with the result that the treated water is as corrosive as distilled water. The water will contain from a trace to a few parts per million of sodium bicarbonate, sometimes a trace of chlorides, and silica equal to that in the raw water. There may or may not be a reduction in organic matter. When insoluble exchange bodies are used, some organic matter may be removed from the water, the maximum reduction observed in soluble organic matter being from 30 to 6 p.p.m. If the organic exchangers are not completely stable, an increase in organic matter may result.

As the cation exchanger is regenerated with an acid, it operates in an acid cycle. This necessitates acid-proof construction if long equipment life is desired. A very satisfactory material of construction is rubber-lined steel. Wood tanks have been used with success for low-pressure work, and hard rubber has been utilized for very small units. If traces of copper and other heavy metals in the water are not objectionable, copper piping and brass valves may be used, but where these metals are objectionable, rubber-lined steel pipe and rubber-lined diaphragm valves are best.

The tanks and fittings used for the anion exchanger must also be resistant to the action of acids, as acidic water from the first stage enters the second stage. The anion exchange body is regenerated with an alkali and operates on an alkaline cycle during regeneration. This requires materials of construction that withstand alkalies as well as acids.

Efficiency

In calculating chemical efficiency it is convenient to convert all salts, acids and caustic to terms of calcium carbonate. By doing this all chemicals involved are put on a common basis. For example, a water having an analysis on the "as is" basis would be converted to terms of calcium carbonate as shown below:

	Hypothetical Combinations, grains per gal.	
	"As Is" Basis	As $CaCO_3$
Calcium carbonate	5.0	5.0
Magnesium carbonate	4.0	4.8
Calcium sulfate	6.0	4.4
Sodium sulfate	7.0	4.9
Sodium chloride	3.0	2.6
Total	25.0	21.7

The total in terms of calcium carbonate constitutes the dissolved solids to be removed and represents the load on the cation exchanger bed. The cation exchanger bed should have a total capacity of 21,700 grains to remove the positive metal ions from 1000 gallons of such water. The anion exchanger bed would not have as much exchange capacity as the first bed, since it would be required to remove only the chloride and sulfate ions. For 1000 gallons of this water the anion exchanger bed should have a capacity of only 11,900 grains, as the carbonates are not removed in the second bed.

The acid required for regeneration, based on 66° Baume sulfuric acid, will vary from 0.2 to 0.4 lb. of acid per 1000 grains of dissolved solids removed by the cation exchanger bed. The average acid consumption will be from 0.25 to 0.35 lb. per 1000 grains in terms of calcium carbonate.

TABLE I

Efficiency, per cent	Acid* per 1000 grains (as $CaCO_3$), lb.	NaOH per 1000 grains of Acid (as $CaCO_3$), lb.	Salt per 1000 grains of Hardness (as $CaCO_3$), lb.
100	0.150	0.114	0.167
80	0.188	0.143	0.209
60	0.250	0.191	0.278
40	0.375	0.286	0.417
20	0.750	0.572	0.835

*66° Baume sulfuric acid.

The caustic required is based on the sum of the chlorides, sulfates and other negative ions removed by the anion exchanger. Very efficient regeneration of the anion exchangers is obtained when caustic soda is used as the regenerent. Chemical efficiencies up to 80 per cent have been obtained, and a chemical efficiency based on chemical equivalents of 70 to 75 per cent can be expected for normal operation.

A comparison of chemical efficiency of acid and caustic soda regenerations for the removal of dissolved salts, together with a comparison of salt efficiency for zeolite regeneration, is interesting in that at the rate of 0.5 lb. of salt per 1000 grains of hardness removed in zeolite softening the chemical efficiency is only 33.4 per cent when based on chemical equivalents (Table I).

Control

The strength of acid solution used for regeneration will depend to some extent on the cost of the water. Acid dilutions varying from 0.5 to 4.0 per cent have been used. Somewhat greater efficiency is obtained with the more dilute acid, but the amount of water required for regeneration is increased due to the high dilution.

It is convenient to pour the concentrated acid into the water in an acid vat and obtain an initial dilution of 10 to 15 per cent acid. There is some heat generated, but not enough to cause sputtering. The final dilution is accomplished by means of an injector.

The caustic solution strength may be carried over a wide range, but the most efficient solution to use is very dilute. Less than one per cent solutions of caustic soda are satisfactory.

The control of this process is simple. The effluent from the cation exchanger bed will be acidic to methyl orange, and this acidity is chemically equivalent to the sulfates, chlorides, and nitrates in the raw water. When tests of the effluent show that the acidity of the effluent has decreased below this amount, the cation exchanger bed should be regenerated.

Tests of the effluent from the anion exchanger are also simple. The effluent from the second stage is neutral or slightly alkaline to methyl orange in normal operation. Whenever a test with methyl orange shows a slight acidity the anion exchanger bed should be regenerated. These same tests will indicate when the two beds are ready to be put in operation after regeneration. Automatic control devices have been worked out to warn the operator when either bed should be regenerated. These control devices are valuable supplemental adjuncts to chemical control.

The time required for regeneration will vary from 30 to 60 minutes for the cation exchanger, and from 45 to 90 minutes for an anion exchanger. Both beds may be regenerated at the same time with a total time consumption of not over 90 minutes.

With either cation or anion exchangers, flow rates up to 6 and 7 gal. per min. per sq. ft. may be used without loss of exchange capacity with beds 30 inches or more in depth. Lower flow rates than 1 gal. per min. per sq. ft. on anion exchanger beds are sometimes accompanied by a slight increase in sodium bicarbonate content in the effluent. It is difficult to wash all of the caustic used in regeneration out of the anion exchanger bed with the result that small quantities are leached out during operation. This is the source of the sodium bicarbonate in the effluent, and if the flow rate is very low the concentration of sodium bicarbonate will increase over the 2 to 5 p.p.m. present at flow rates from 3 to 6 gal. per min. per sq. ft.

More wash water is required to wash out the excess caustic from the anion exchanger bed after regeneration than is required to wash out the excess acid from the cation exchanger bed. The over-all water requirements for regeneration and washing for both beds will vary between 30 and 40 gal. per cu. ft. of exchange bodies in the system depending upon the dilutions of acid and caustic soda used.

Conclusions

These newer exchange bodies have increased the usefulness and scope of exchange processes. By the proper combination of such materials, a great improvement may be obtained over the zeolite method of treating water, particularly for boiler feedwater purposes.

It appears that these exchange bodies will be used for treating water to a greater extent than has been the case with zeolites. However, these exchange processes should not be looked upon as a "cure all" for water treatment problems. If the water is to be used for boiler feed, chemical aftertreatment and control will be required for corrosion and silica-scale prevention. The choice of treatment will necessarily be made on the basis of cost and the operating conditions to be met. These factors can be determined by a careful study of the recent advances in both the chemical and exchange process of water treatment.

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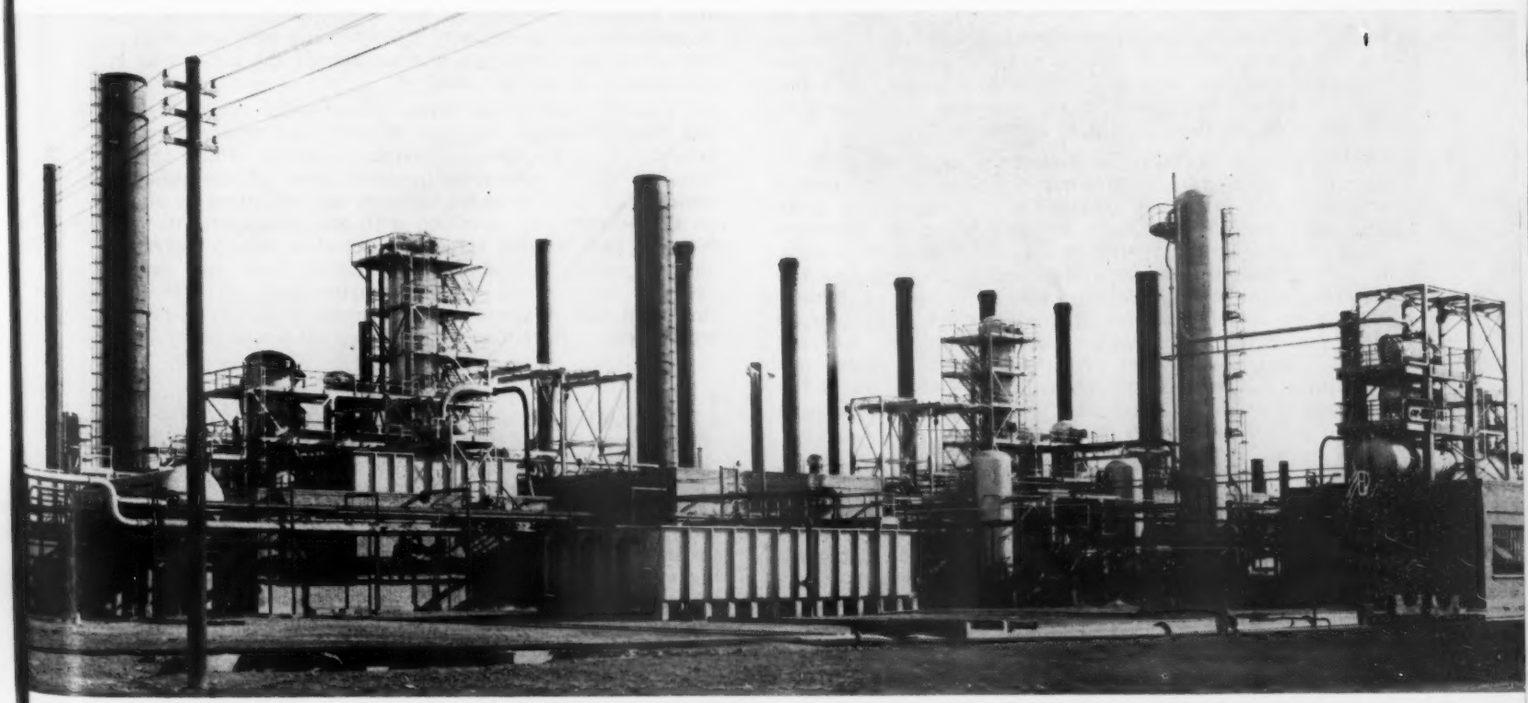

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Heaters For Petroleum Refining

By L. A. Mekler*

Part 2

Part One of this article was printed in the July 27, 1938 issue of NATIONAL PETROLEUM NEWS on page R-355.

MODERN cracking units, particularly those of the selective type and of larger capacities, separate the total feed into as many as five fractions and subject each fraction to its optimum cracking conditions. To maintain the range of relationships between quantity, heat transfer rates, pressure drop and physical state, etc., as explained above, the fractions are often split up into a number of parallel streams. The heaters shown on Figs. 17 to 24 are not suitable for multi-coil operation with optimum conditions for each coil unless a large number of such heaters is used and with odd number of streams of the different fractions, satisfactory arrangements may be difficult to make even with multiple heaters.

While such heaters are sometimes designed to process large quantities of different fractions in one heater structure, this is usually obtained at the expense of flexibility with the coils and their distribution usually arranged not for the optimum conditions for the individual coils, but for a compromise between these conditions and the possible overall-oil performance of the type of heater. When very large structures of these heaters are employed their structural relationship found satisfactory for the smaller heaters is often disturbed, affecting their gas hydraulics and resulting in channeling or cross flow of the products of combustion, internal free convection eddies and uneven heat distribution.

Figs. 25 and 26 show two types of Equiflux heaters in which the tubes are irradiated from both sides incorporating all the advantages of double irradiations as discussed in connection with Figs. 5 and 6. Irradiation of the tubes from both sides in Equiflux heaters, and the comparatively small cold fraction formed by the tube banks, permits the use of much higher rates of heat input than can be obtained in heaters as shown on Figs.17 to 24, which makes the Equiflux heaters suitable for any type of cracking stock up to and including cracked residues where the shortest possible coil is desirable.

The cellular structure of the heaters permits the use of any number of streams with each stream subjected to the optimum thermal treatment. The cellular structure also permits maintaining the optimum dimensional relationship of the heater structure for the best gas hydraulics within the structure irrespective of the total heat requirements of the process.

*Combustion engineer, Universal Oil Products Co.

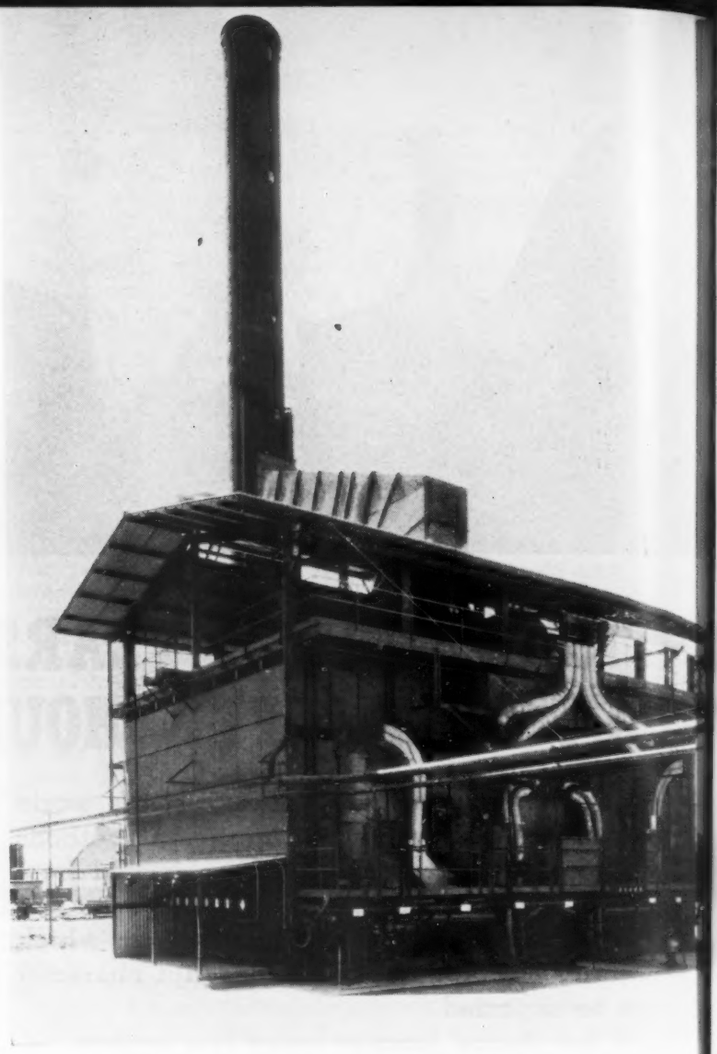

Fig. 29. Type "A" 4-cell Equiflux heater for processing 29,000 bbls. of heavy combined feed per stream day

Fig. 27 shows the wide variation in types of flow and heating curves that can be employed in the Equiflux heaters. Cell 1 shows an arrangement in which the oil flows in series criss-crossing both rows of the tubes in the cell. A heating curve through the cell tubes as shown on 12C is normally obtained with this arrangement. Cell 2 shows two parallel streams through a cell, an arrangement especially adapted where shorter coils and smaller diameter tubes than those normally obtained with flow shown in Cell 1 are desired to produce the lowest time-temperature effect for a given outlet temperature.

IDENTICAL thermal treatment of the oil in the two streams can be obtained by adjusting the fires on each side of the bank. With the relatively wide vertical spacing of the tubes in the streams and, therefore, with a more even distribution of heat between the exposed and the partially shielded faces of the tubes in each stream this adjustment of fires does not have to be very close. A heating curve as shown on Fig. 12C is normally obtained in the cell tubes of each stream. Cell 3 shows a series flow through the two rows of the tubes in the cell, with the flow first through one row and then through the other. Considering the tube bank in this cell as consisting of two portions EF and GH, the portion EF is the exposed row and the portion GH is the shielded row, with respect to wall M fired by burners B. With respect to wall N, fired by burners D, portion GH is the exposed row and portion EF is the shielded row. With a close vertical spacing of the tubes in each row normally used with this flow

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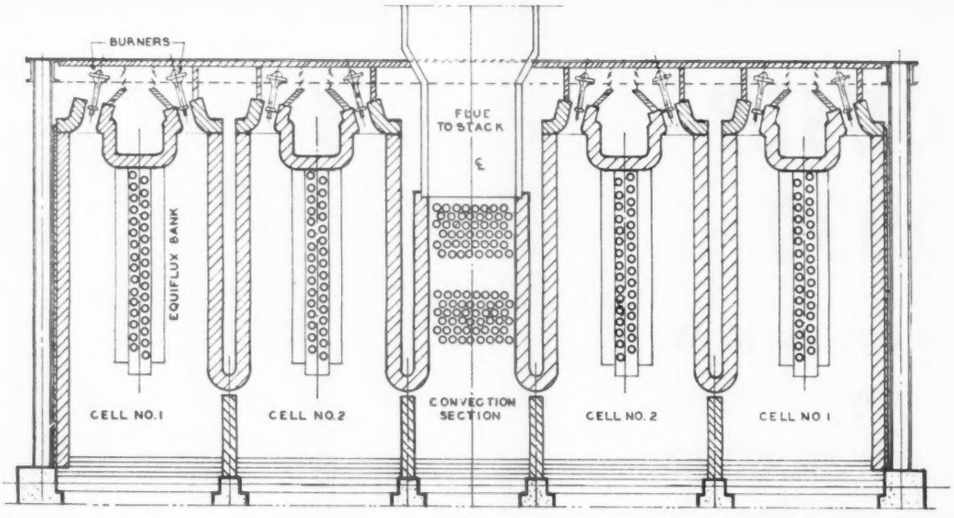

Fig. 25. Type "A" 4-cell Equiflux heater

Fraction cold	0.220
Effectiveness of circumferential surface of Equiflux bank from Fig. 4	0.375

to accentuate the difference of heat pickup by the exposed and the shielded rows as related to walls M and N, the rates of heat input into portions EG and GH can be materially changed by different rates of firing of burners B and D, so that the heating curve for the whole bank EFGH may be changed from that as shown on 12A to that of 12D.

The flow arrangement through Cells 4 and 5 applies particularly to comparatively large capacity coils where a wide range of changes of heating curve is desired. The heat input rates into the coils in Cell 4 are completely independent of the rates that could be used in Cell 5 and can be varied at will without affecting each other, so that heating curves varying from that shown on 12A to that of 12F can be obtained through the coil by varying the respective rates of firing in the cells. By using a parallel flow through Cells 4 and 5, similar to that shown for Cell 2, and by combining these two cells in series, two parallel streams with independent control of rates of heat input to the two sections of each coil can be obtained.

At the present time 28 Equiflux heaters with a total of 65 cells are in operation for processing cracking stocks varying from 61° A.P.I. naphtha to 2° A.P.I. cracked residuum. The total quantity of feed to these heaters is over 260,000 barrels per stream day and the total amount of heat supplied to the feed is approximately 1,250 million B.t.u. per hour. The heaters vary in size from a single cell heater with a capacity of 875 barrels per stream day of naphtha reforming and a heat load of 10 million B.t.u.'s per hour applied to the oil, up to a 4-cell heater with a capacity of 29,000 barrels per stream day of heavy combined feed and a heat load of 92 million B.t.u.'s per hour applied to the oil. One 3-cell reforming heater and two 5-cell combination light and heavy oil heaters are now under design. The reforming heater has a rated capacity of 6,000 barrels per stream day and a heat load of 50 million B.t.u. per hour applied to the oil and each of the 5-cell heaters have a rated capacity of 33,000 barrels of heavy and light combined feed and a heat load of 123 million B.t.u. per hour applied to the oil.

Three structural types of Equiflux heaters have been built up to date: Type "A", a down shot fired multi-cell heater, with a common structure for the convection banks of the different streams; Type "B", a down shot fired single or multi-cell heater with the convection banks of the different streams located below the cell tubes of the stream in the same cell structure; and Type "C", an up shot fired single cell heater with the convection bank

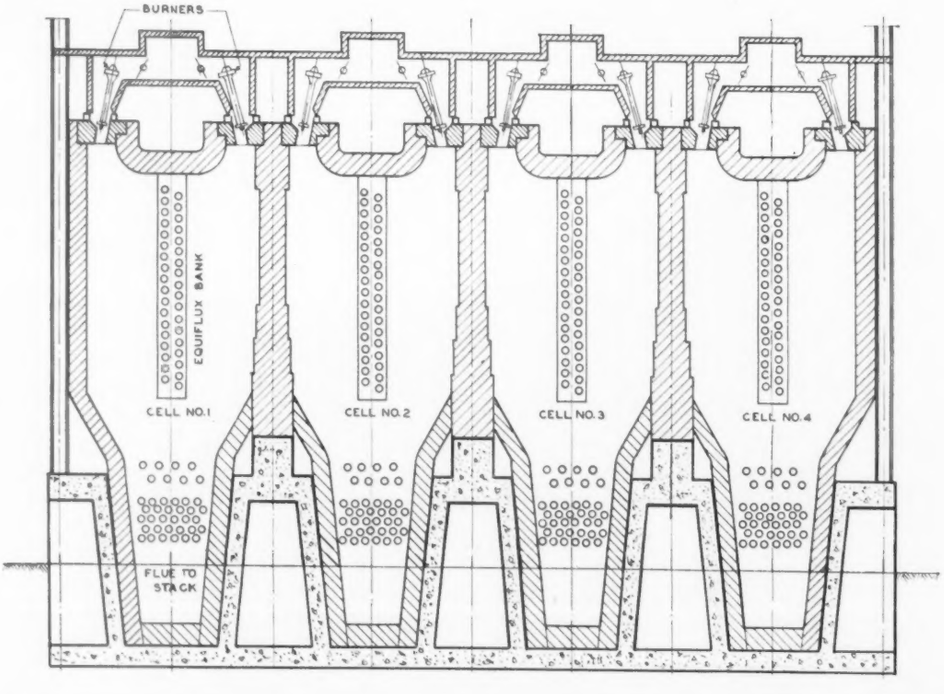

Fig. 26. Type "B" 4-cell Equiflux heater

Fraction cold	0.340
Effectiveness of circumferential surface of Equiflux bank from Fig. 4	0.27

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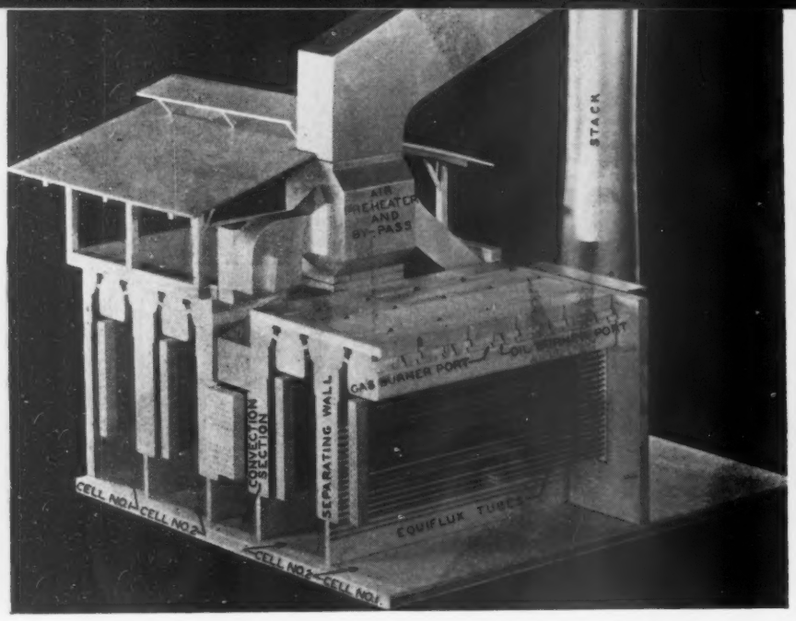

Fig. 28. Cutaway model of Type "A" 4-cell Equiflux heater

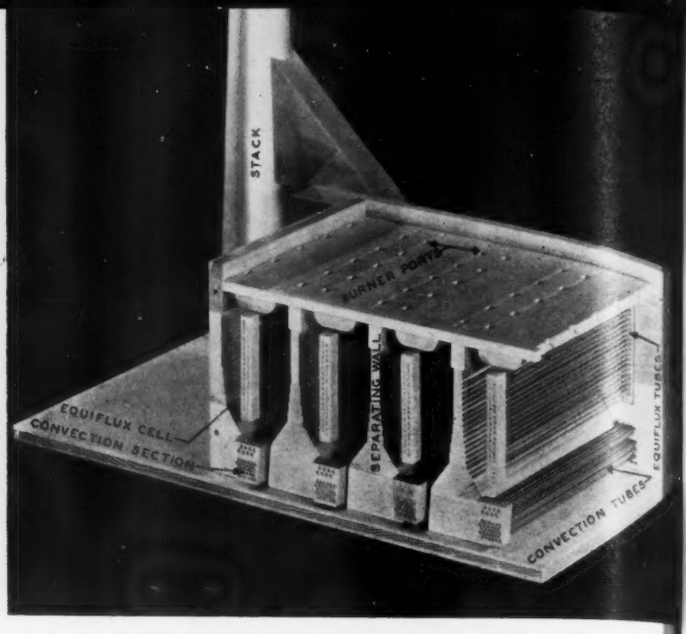

Fig. 30. Cutaway model of Type "B" 4-cell Equiflux heater

located above the cell in the same structure. Type "B" heaters are of later design and are used almost exclusively at present.

Fig. 28 shows a photograph of a scale cutaway model of a 4-cell type "A" Equiflux heater, with the front wall, side wall and part of the roof structure removed to show the principal features of construction of this type of heater. The cross section of this heater is shown on Fig. 25. Fig. 29 shows a photograph of the actual Type "A" heater as installed to process a total of 29,000 barrels of heavy combined feed in four streams of 7250 barrels of each.

Fig. 30 shows a photograph of a scale cutaway model of a Type "B" 4-cell Equiflux heater. The cross section of this heater is shown on Fig. 26. Fig. 31 shows a photograph of the actual Type "B" heater as installed to process a variety of cracking stocks ranging from light straight run naphtha to heavy cracked gas oil. Fig. 32 shows a simplified cross section of this heater built with suspended refractories throughout including the separating walls. Fig. 33 shows a simplified cross section of a 3-cell Type "B" Equiflux heater as installed for processing 15,750 barrels of heavy combined feed in three streams of 5,250 barrels. This heater is built with suspended refractories on the outside walls and with conventional or "gravity" construction of the separating walls.

Fig. 34 shows a simplified cross section of a type "C" heater.

Fig. 35 shows the flow arrangement in the 4-cell type "A" heater shown on the photograph of Fig. 29. This heater is symmetrical along the center line, and each of the four streams flows in series through two cells. The flow permits a wide control of the heating curve by varying the relative rates of firing in the first and the second cell of each flow. Additional control of the heating curve to a lesser degree may be obtained by changing the air-fuel ratio to the burners. The higher this ratio, the higher will be the temperature of the oil leaving the convection section.

Fig. 36 shows the flow through a 3-cell type "B" Equiflux heater as shown on Fig. 33. This flow is arranged for a comparatively fixed heating curve that can be obtained with substantially uniform rates of heat input to the Equiflux tubes.

Fig. 37 shows the flow through a 3-cell type "B" Equiflux heater used for processing a total of 9720 barrels of

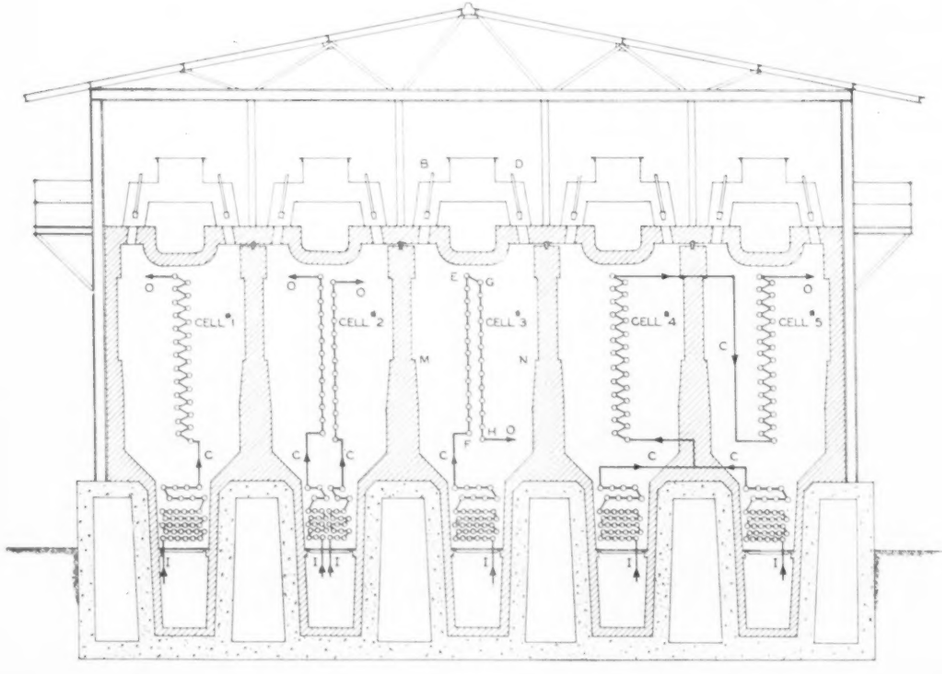

Fig. 27. Typical flow arrangements for Equiflux banks

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2

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3

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4

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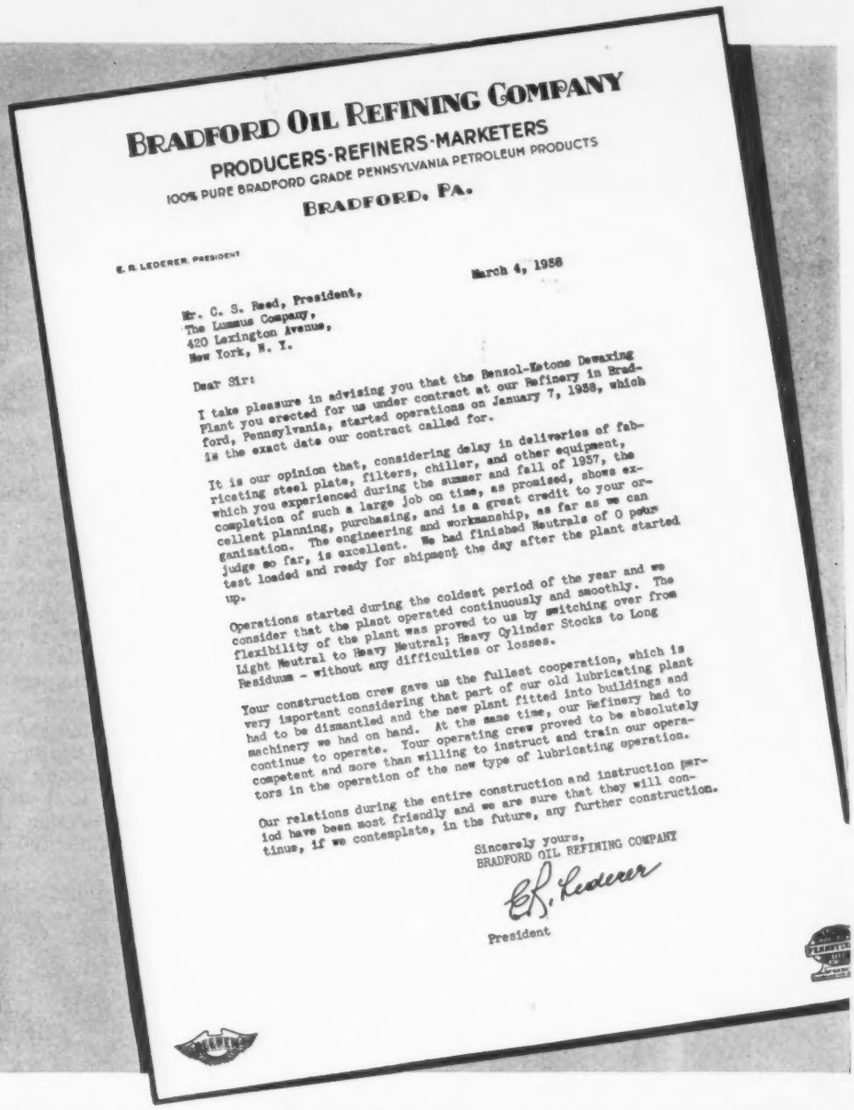

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March 4, 1938

Mr. C. S. Reed, President,
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420 Lexington Avenue,
New York, N. Y.

Dear Sir:

I take pleasure in advising you that the Benzol-Ketone Dewaxing Plant you erected for us under contract at our Refinery in Bradford, Pennsylvania, started operations on January 7, 1938, which is the exact date our contract called for.

It is our opinion that, considering delay in deliveries of fabricating steel plate, filters, chiller, and other equipment, which you experienced during the summer and fall of 1937, the completion of such a large job on time, as promised, shows excellent planning, purchasing, and workmanship, as far as we can judge so far, is excellent. The engineering and workmanship, as far as we can ganisation. We had finished Neutrals of 0 pour test loaded and ready for shipment the day after the plant started up.

Operations started during the coldest period of the year and we consider that the plant operated continuously and smoothly. The flexibility of the plant was proved to us by switching over from Light Neutral to Heavy Neutral; Heavy Cylinder Stocks to Long Residuum - without any difficulties or losses.

Your construction crew gave us the fullest cooperation, which is very important considering that part of our old lubricating plant had to be dismantled and the new plant fitted into buildings and machinery we had on hand. At the same time, our Refinery had to continue to operate. Your operating crew proved to be absolutely competent and more than willing to instruct and train our operators in the operation of the new type of lubricating operation.

Our relations during the entire construction and instruction period have been most friendly and we are sure that they will continue, if we contemplate, in the future, any further construction.

Sincerely yours,
BRADFORD OIL REFINING COMPANY
E. R. Lederer
President

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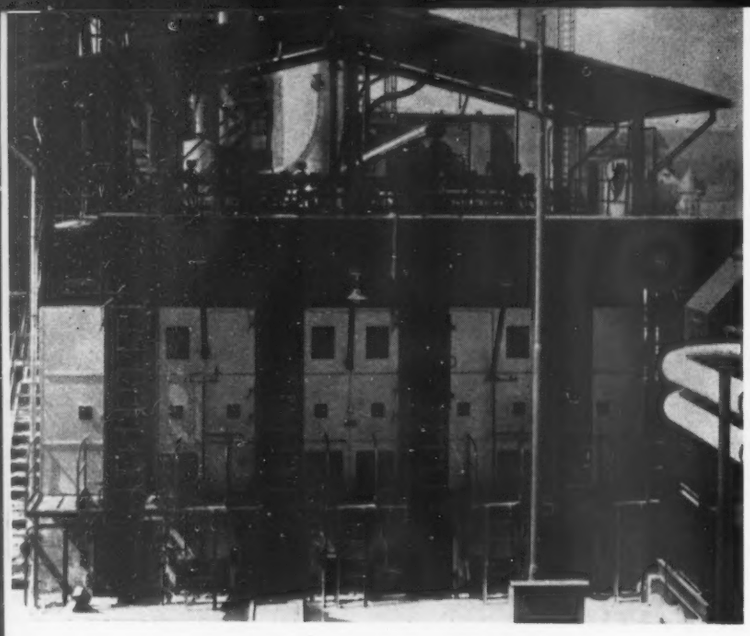

Fig. 31. 4-cell Type "B" Equiflux heater

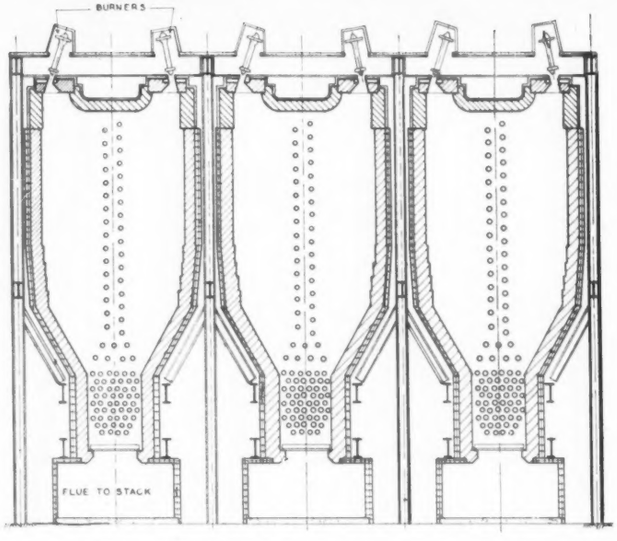

Fig. 32. Cross section through 3-cell Type "B" Equiflux heater with setting of suspended insulated air-cooled refractories throughout

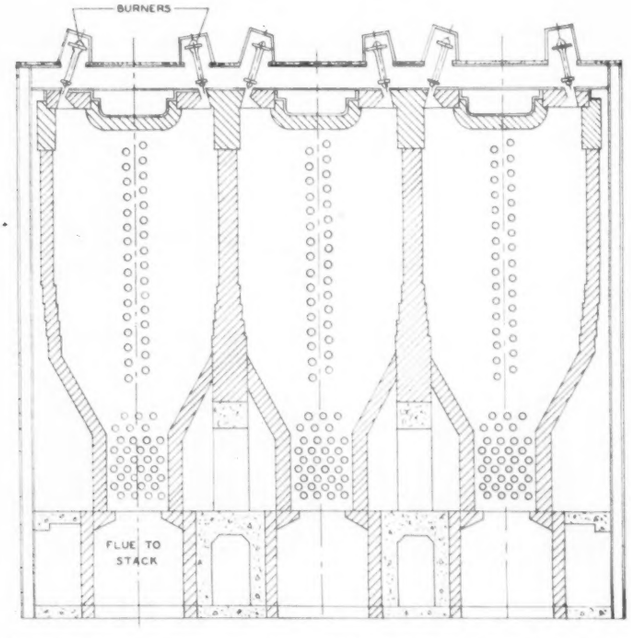

Fig. 33. Cross section through 3-cell Type "B" Equiflux heater with separating walls of non-suspended refractories

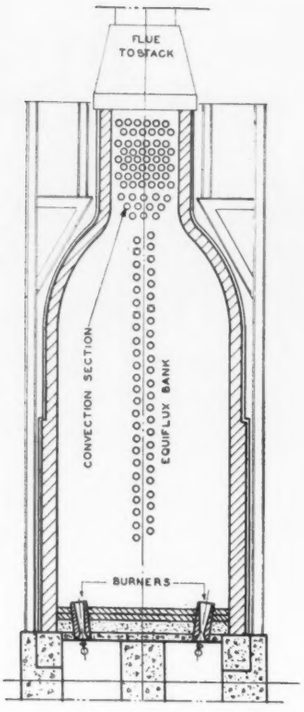

Fig. 34. Cross section through single cell Type "C" Equiflux heater

light combined feed. *This flow is arranged for a controlled heating curve within each cell and the vertical spacing of the cell tubes is on closer centers than those used for the flows in Figs.* 35 *and* 36. Each cell of this heater has the same characteristics as those of cell 3 of Fig. 27.

Fig. 38 shows the flow through a 3-cell Equiflux heater used for reforming of two streams of naphtha. The outside cells are used for preheating each stream to the soaking temperature and the inside cell for soaking of both streams.

Fig. 39 shows the flow through a Type "B" 2-cell Equiflux heater designed to process on a once-through basis cracking stocks varying from light straight run naphtha to heavy gas oil. A controlled heating curve soaking section is provided in this heater to obtain the different degrees of soaking best suited for the stock processed.

The modern trend in design of petroleum refining equipment is toward larger, more efficient units that are

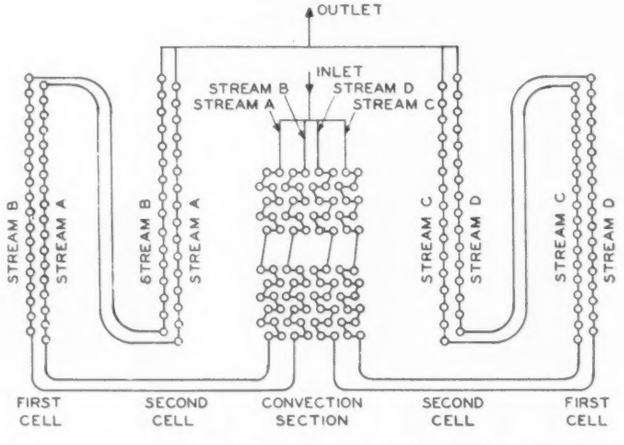

Fig. 35. Schematic oil flow arrangement through 4-cell Type "A" Equiflux heater as shown on Fig. 25

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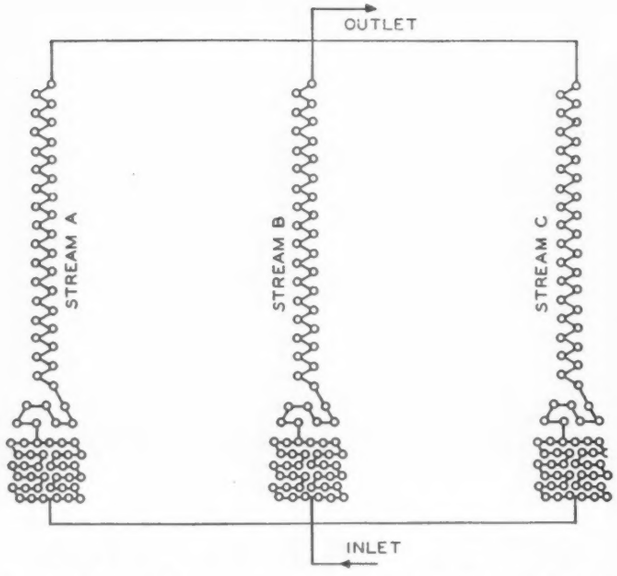

Fig. 36. Schematic flow arrangement through Type "B" 3-cell Equiflux heater for processing three parallel streams with substantially fixed heating curve

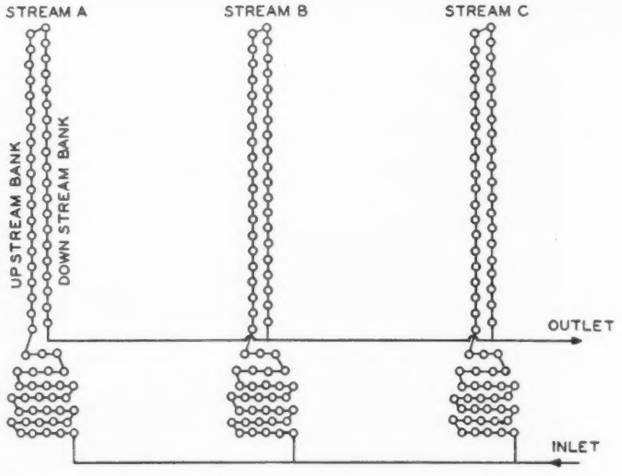

Fig. 37. Schematic flow arrangement through 3-cell Type "B" Equiflux heater for processing three parallel streams with a controlled heating curve

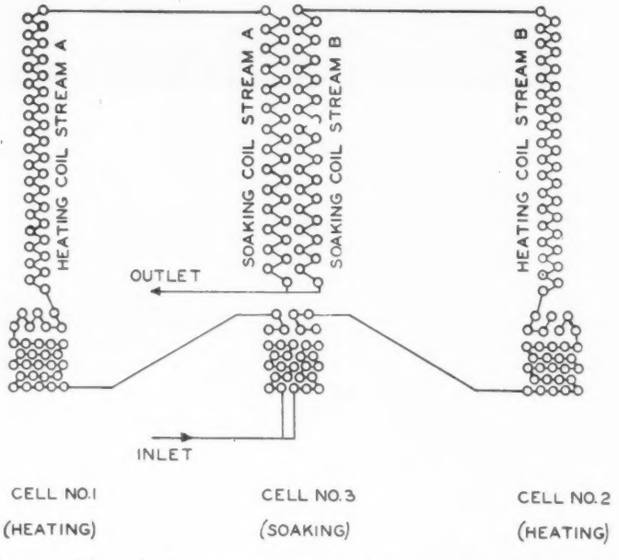

Fig. 38. Schematic flow arrangement through a 3-cell Type "B" Equiflux heater for processing two parallel streams with a separately fired soaking coil

responsive to accurate control of operating conditions, and that are sufficiently flexible to meet a wide range of these conditions to accommodate possible changes in the stocks processed or final products desired. With the constantly increasing demand for petroleum products that have to meet rigid specifications, and with these specifications changing rapidly, inflexible petroleum refining equipment may become obsolete and may require rebuilding or replacement long before it shows appreciable signs of wear and tear. In most refining processes, and particularly in cracking processes, the heater is the most important and usually the most expensive single piece of equipment and is often the determining factor whether the unit can be modified to meet new operating conditions, or whether the unit has to be completely rebuilt or replaced.

Table 1 shows operating results obtained with the different types of Equiflux heaters when processing different cracking stocks. The table illustrates the applicability of Equiflux heaters to widely different operating requirements of capacity, type of feed and time-temperature relationship. Each of the heaters shown in the tabu-

TABLE 1
OPERATING DATA OBTAINED WITH DIFFERENT TYPES OF EQUIFLUX HEATERS

CRACKING STOCK	HEAVY OIL						CRACKED RESIDUE			LIGHT OIL		NAPHTHA	
	1	2	3	4	5	6	7	8	9	10	11	12	13
TYPE OF HEATER	A	A	B	B	A	C	A	A	A	B	B	B	A
Total Feed Bbls./day	13,300	16,300	15,750	15,960	29,000	2,650	5,300	7,600	7,800	9,720	6,600	1,340	6,000
Feed per stream, Bbls./day	3,325	4,075	5,250	5,320	7,225	2,650	2,650	3,800	3,900	3,240	1,650	1,340	3,000
Grav. of Cracking Stock °API	10.0	17.8	18.9	12.5	17.4	23.7	3.2	9.0	2.0	15.4	21	61.6	65.0
Inlet Temp., °F.	735	735	570	735	715	672	750	750	775	660	660	75	200
Outlet Temp., °F.	915	925	920	915	920	942	940	920	950	980	960	1,030	1,040
Total Heat Supplied to Oil Million B.t.u./hr.	44	52.4	73.2	51.0	91.6	10.0	20.0	25.2	28.6	40.1	29.6	12.5	48.0
Million B.t.u./hr. to Oil/Stream	10.9	13.1	24.4	17.0	22.9	10.0	10.0	12.6	14.3	16.7	7.40	12.5	24.0
Number of Cells	4	4	3	3	4	1	2	2	2	3	4	2	3
Number of Streams	4	4	3	3	4	1	2	2	2	3	4	1	2
EQUIFLUX CELLS													
Inlet Temp., °F.	779	790	675	810	775	760	788	800	810	805	797	.....	.....
Outlet Temp., °F.	914	925	920	912	920	942	940	920	950	980	959	1,003	1,020
Heat Supplied to Oil Million B.t.u./hr./Stream	9.30	10.80	19.00	12.70	18.70	8.0	8.90	10.55	12.70	11.50	5.15	6.80	15.0
% of Total Heat	74.8	82.5	77.0	74.9	81.6	80.0	8.9	83.7	88.9	68.7	69.2	54.5	63.0
External Surface, Sq. Ft./Strm.	613	717	1,130	858	936	741	472	717	717	1,120	666	633	1,090
Internal Surface, Sq. Ft./Strm.	503	568	935	740	740	600	344	568	568	865	542	506	774
Heat Input Rate, B.t.u. /hr./Sq. Ft. of External Surface, Average	15,200	15,000	16,800	14,750	20,000	10,650	18,850	14,700	17,650	10,250	*10,800	*10,750	*13,750
Heat Input Rate, B.t.u. /hr./Sq. Ft. of Ext. Surface.													
1st Cell	14,200	17,900	18,500	.....	20,000	.....	14,400	17,500	12,700	†13,300	.....	.....	.....
2nd Cell	16,000	12,100	15,100	.....	20,000	.....	23,300	11,900	22,600	‡7,200	.....	.....	.....
Heat Input Rate, B.t.u. /hr./Sq. Ft. of Internal Surface, Average	18,500	19,000	20,400	17,150	25,300	13,300	25,900	18,600	22,400	13,300	*13,300	*13,450	*19,400
Heat Input Rate, B.t.u. /hr./Sq. Ft. Internal Surface.													
1st Cell	17,300	22,500	22,500	.....	25,400	.....	19,800	22,100	16,050	17,200	.....	.....	.....
2nd Cell	19,500	15,300	18,300	.....	25,400	.....	32,000	15,000	28,600	9,350	.....	.....	.....

*Heating section only. †Up stream. ‡Down stream.

lation can be converted to almost any of the services shown in the tabulation, or any of the flows shown on Fig. 27 with relatively small expenditures of time or money, and in some cases with no expenditure at all.

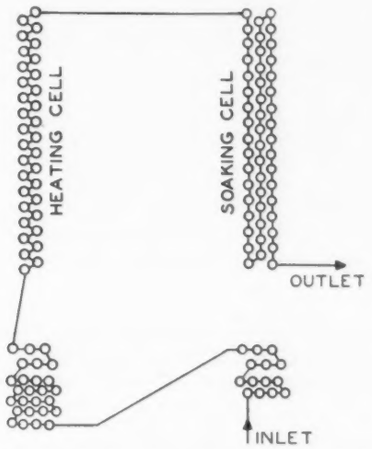

Fig. 39. Schematic flow arrangement through a 2-cell Type "B" Equiflux heater with a separately fired variable heating curve soaking coil

* * *

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* * *

ACKNOWLEDGMENT

The author is greatly indebted to the Universal Oil Products Co. for their permission to use for this article technical data and operating results from their experimental, development and commercial cracking units, and to Messrs. H. A. Becker and R. F. Deniston, of the Heater Department, for their assistance in preparation of charts and the table.

Correction

On page R-361, first column, line nine, July 27th issue, the sentence should read: "For example, the radiant heat transfer from gases at 1330° F. to tubes with a metal temperature **of 800° F.** will be, etc."

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Activities OF EQUIPMENT MANUFACTURERS

GASKET—For sealing boiler manholes, handholes and tube plates, Johns-Manville has developed a "Spirotallic" gasket constructed of pre-formed plies of asbestos and cold-rolled, cadmium-plated steel. The material is spirally wound in such a manner that the asbestos serves to seat the adjacent, interlocking metal plies.

Ability to compress under flange pressure and then to rebound when the pressure is removed is said to be an outstanding feature of the gasket. Standard sizes in both round and oval form are available. Thicknesses are 1/8, 3/16 and 1/4 inch.

* * *

FLOW INDICATOR—The Permutit Co., 330 West Forty-second Street, New York, has announced a rate-of-flow indicator applicable to water treating systems which will indicate to operators the rate of filtration and softening, for guidance in controlling flow rates. Among its features are protection against dirt in the water, elimination of stuffing boxes, and the fact that no moving parts are exposed to the water.

* * *

COMPRESSORS—The Memphis Natural Gas Co. is adding two 600 hp. 6-cylinder Clark "Angle" compressors to their Guthrie, La., booster station. The station now contains four, twin tandem, 1250 hp. horizontal units.

* * *

OIL CLEANING—The Sharples Specialty Co., Twenty-third and Westmoreland Streets, Philadelphia, has published three booklets dealing with Clean Diesel Oil and Turbine Oil Purification (on ships and in stationary plants). The use of centrifuges for cleaning these oils is described. A feature of the booklets is an inserted information sheet by which interested parties may supply sufficient information in one writing to secure a recommendation of oil purifier to meet the specific conditions.

* * *

SAFETY MANUAL—A new Manual for the Safe Handling of Inflammable and Combustible Liquids has just been issued by the U. S. Bureau of Marine Inspection and Navigation as Education Series No. 1. The new manual is identical with an earlier manual dated Oct. 1, 1936, except for section (g) under General Safety Precautions. A new section on ventilation replaces the old section on oxygen breathing apparatus.

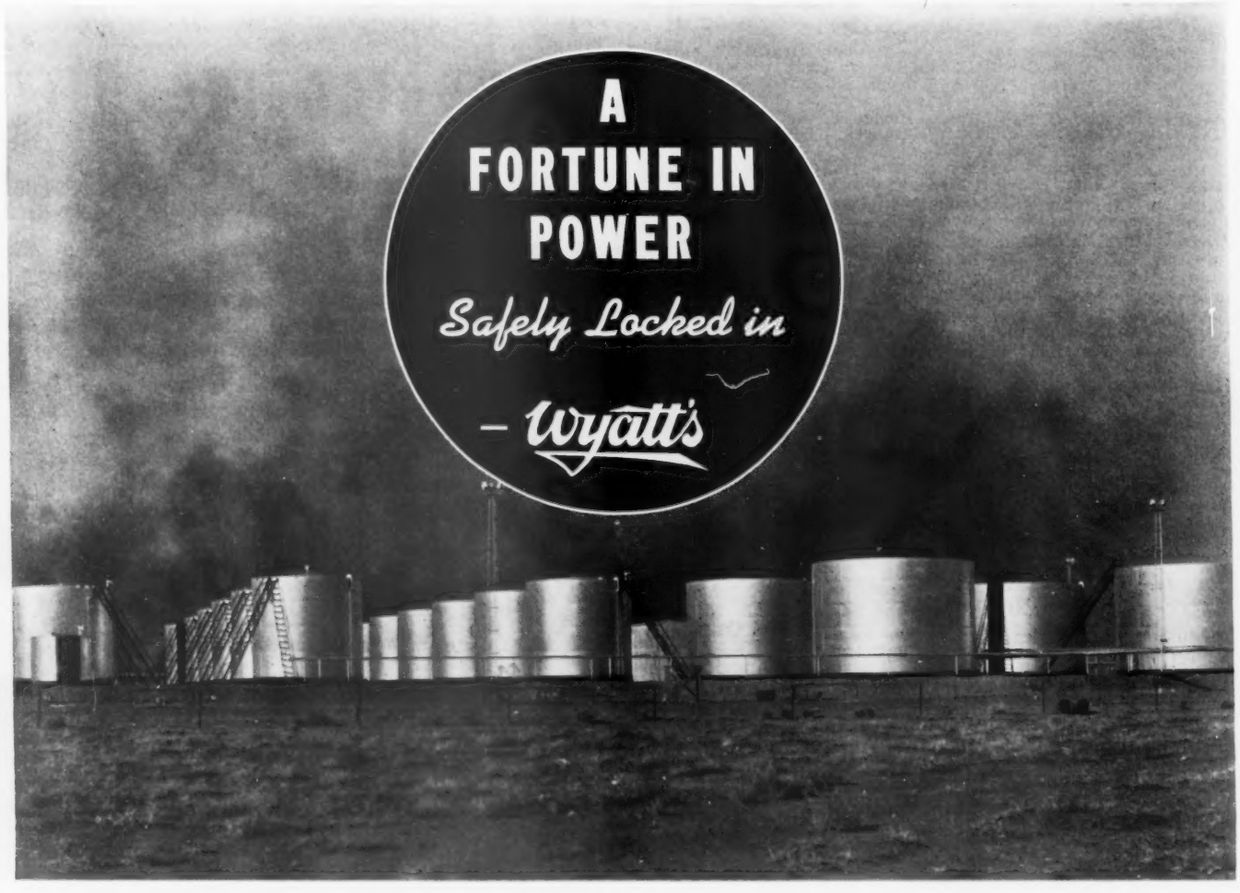
* * *

C. W. Crumb is newly appointed central division sales manager for Oliver United Filters Inc. at Chicago, after an association of 11 years with the company as sales engineer.

* * *

TOXIC GAS DETECTOR—Quantitative estimation of toxic gases in low concentrations in air is said to be possible with a new portable apparatus incorporating colorimetric measurement. The Tintometer Ltd., Salisbury, and Griffin & Tatlock Ltd., London, have co-operated in producing the apparatus.

A known volume of the suspected air or gas is drawn through a liquid or paper test medium. The resultant color is compared with standard colors. Gases dealt with include aniline, arsine, benzene, carbon bisulfide, carbon monoxide, chlorine, hydrogen cyanide, hydrogen sulfide, nitrous fumes, phosgene, and sulfur dioxide. Leaflet 1241, giving full particulars, will be sent on application to either of the firms named.



Test Method Revisions Announced by A.S.T.M.

CLEVELAND, Aug. 18.—A number of recommendations submitted by Committee D-2 on Petroleum Products and Lubricants to the American Society for Testing Materials at its recent annual meeting were accepted by the society.

Newly accepted tentative standards include a test for acid heat of gasoline which is roughly indicative of the amount of unsaturated hydrocarbons in the gasoline that are reactive with sulfuric acid under the test conditions. Another accepted tentative standard is a test for unsulfonated residue of plant spray oils. In addition, new specifications for Stoddard solvent were submitted and accepted.

Tests for determining the ash content of petroleum oils and saponification number were approved but, since they were not included in the D-2 report, they are subject to confirmation by letter ballot. The latter is a consolidation of two present methods which are to be withdrawn, namely D 94-36 and D 438-36T.

Changes accepted in the tentative method of test for knock characteristics of motor fuels (D 357-37T) were essentially an editorial clarification and amplification. Changes were also accepted from the floor on the tentative method of test for vapor pressure of petroleum products (Reid method) (D 323-37T). These changes will be subject to letter ballot the results of which are not yet complete. The changes in the test for vapor pressure deal with gage accuracy, sampling, the water displacement method, and a few other details.

The proposed revision of the tentative methods of test for kinematic viscosity (D 445-37T) was accepted and the methods as revised were continued as tentative. The revision was of a minor nature and concerned changes in the dimensions of the FitzSimons' viscosimeter and slight changes in the directions for handling the instrument.

A revision proposed for immediate adoption in the Standard Methods of Testing Gas Oils (Gravity, Distillation, Sulfur, Carbon Residue, Pour Point, Viscosity, Water) (D 158-28) was unanimously approved for reference to letter ballot of the society for adoption as standard. The revision of these methods, recommended by subcommittee VIII on Distillation consists of the deletion of references to tests other than the distillation test and a clarification and slight modification of the distillation procedure.

The Tentative Method of Test for Color of Refined Petroleum Oil by Means of Saybolt Chromometer (D 156-34T) was approved for reference to letter ballot of the society for adoption as standard. The tentative revision of the Standard Method of Test for Viscosity by Means of the Saybolt Viscosimeter (D 88-36) was approved for reference to letter ballot of the society for adoption as standard with an additional change presented on the floor and subject to favorable letter ballot of Committee D-2. The proposed revision substitutes for the following in *Section* 4 (*d*): "In case the flash point is less than 50 F. (10 C.) above the temperature of test, the oil shall be heated to room temperature only," the sentence, "In no case, however, shall the oil be preheated to a temperature above 50 F. below the flash point.

The following immediate revision of the Standard Method of Test for Distillation of Gasoline, Naphtha, Kerosine, and Similar Petroleum Products (D 86-35), presented on the floor at the annual meeting, approved for reference to letter ballot of the Society for adoption as standard, subject to letter ballot of Committee D-2:

The following new paragraph was added to section 9: "The sum of the volume collected in the cylinder at any specified temperature and the distillation loss may be recorded as the percentage evaporated at the temperature in question."

To be published as information is a proposed method of test for determining ignition quality of diesel fuels and further changes are contemplated in the diesel-fuel-oil classification as published in the 1937 report.

Of outstanding interest to committee members was a round-table discussion at the meeting on the present state of knowledge of the oxidation of motor oils and problems resulting from oxidation, including the nomenclature of the products formed. This conference proved to be a constructive contribution to the work of Technical Committee B on Lubricants and the results will form the basis of its future program.

Several additional recommendations for inclusion in the Committee D-2 report were presented on the floor at the meeting and accepted subject to favorable letter ballot of the committee. These included a new tentative method for determining ash content of petroleum oils, new tentative method of test for saponification number to replace D 94-36 and D 438-36T, a revision of tentative method of test for expressible oil and moisture in paraffin waxes (D 308-29T), a revision of tentative method of test for penetration of greases and petroleum (D 217-33T), a tentative revision of the standard method of test for cloud and pour points (D 97-34), a tentative revision of the standard method of test for gravity of petroleum and petroleum products by means of hydrometer (D 287-37), a proposed method of test for ignition quality of diesel fuels, and revisions in the diesel-fuel-oil classification, previously mentioned.

Pioneer Technologist Dies

News of the death, in Cleveland, last Dec. 18, of W. C. Wells, one of the early petroleum technologists in this country, who had developed the Wells gasoline process, has not been brought to the attention of a great many in refining circles.

Mr. Wells had passed his 96th birthday on Oct. 23, 1937, only a few weeks before his death from pneumonia at the home of his son at 13021 Euclid Ave., Cleveland. During a great portion of the elder Wells' active life he had lived in Columbus, where he had maintained laboratories. He had written on refining subjects and was the inventor of devices used in oil refining. He had also done work in the extraction of oil from shale. Frank E. Wells, the son, is continuing to live in Cleveland.

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(*See also page 52*)

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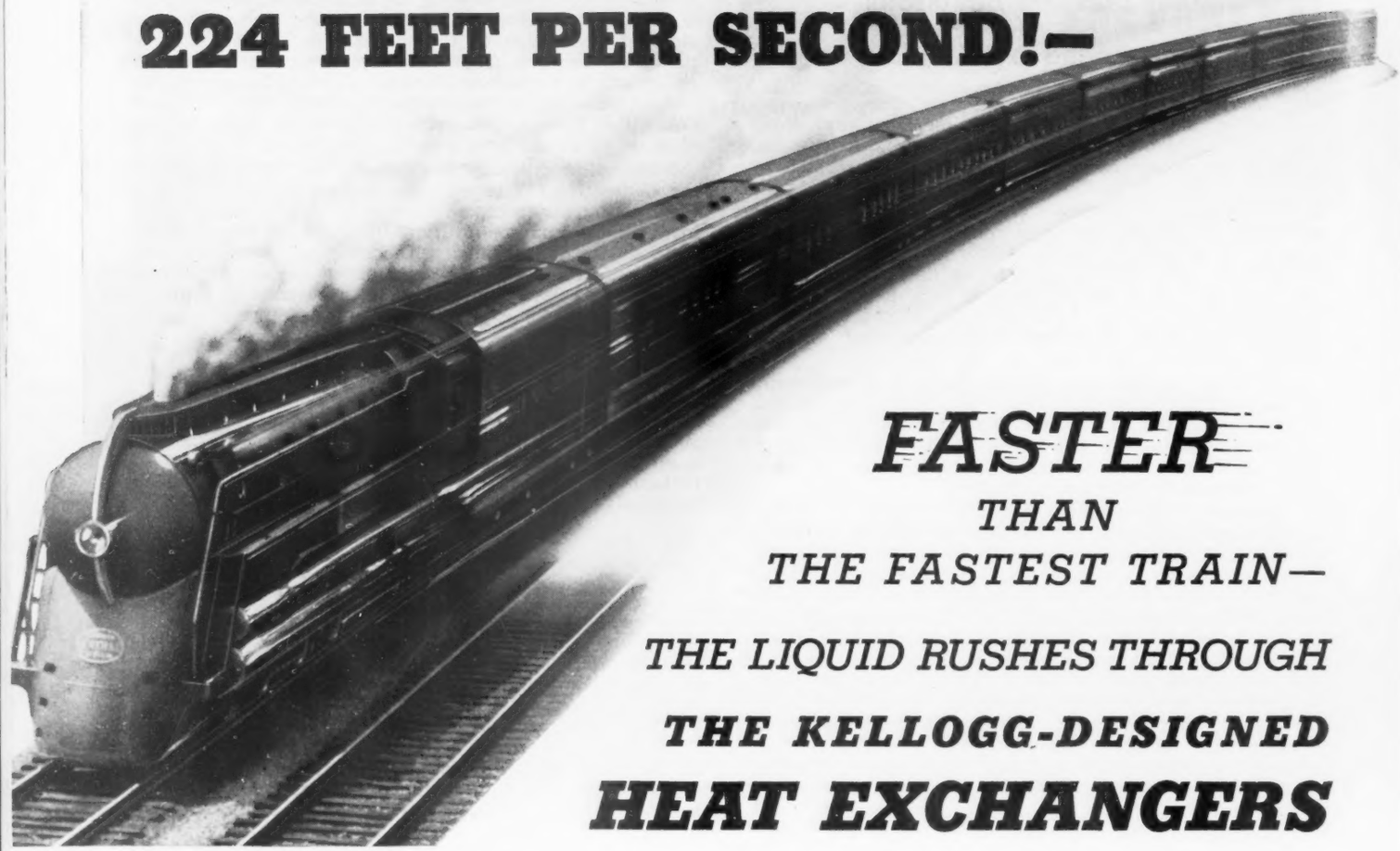

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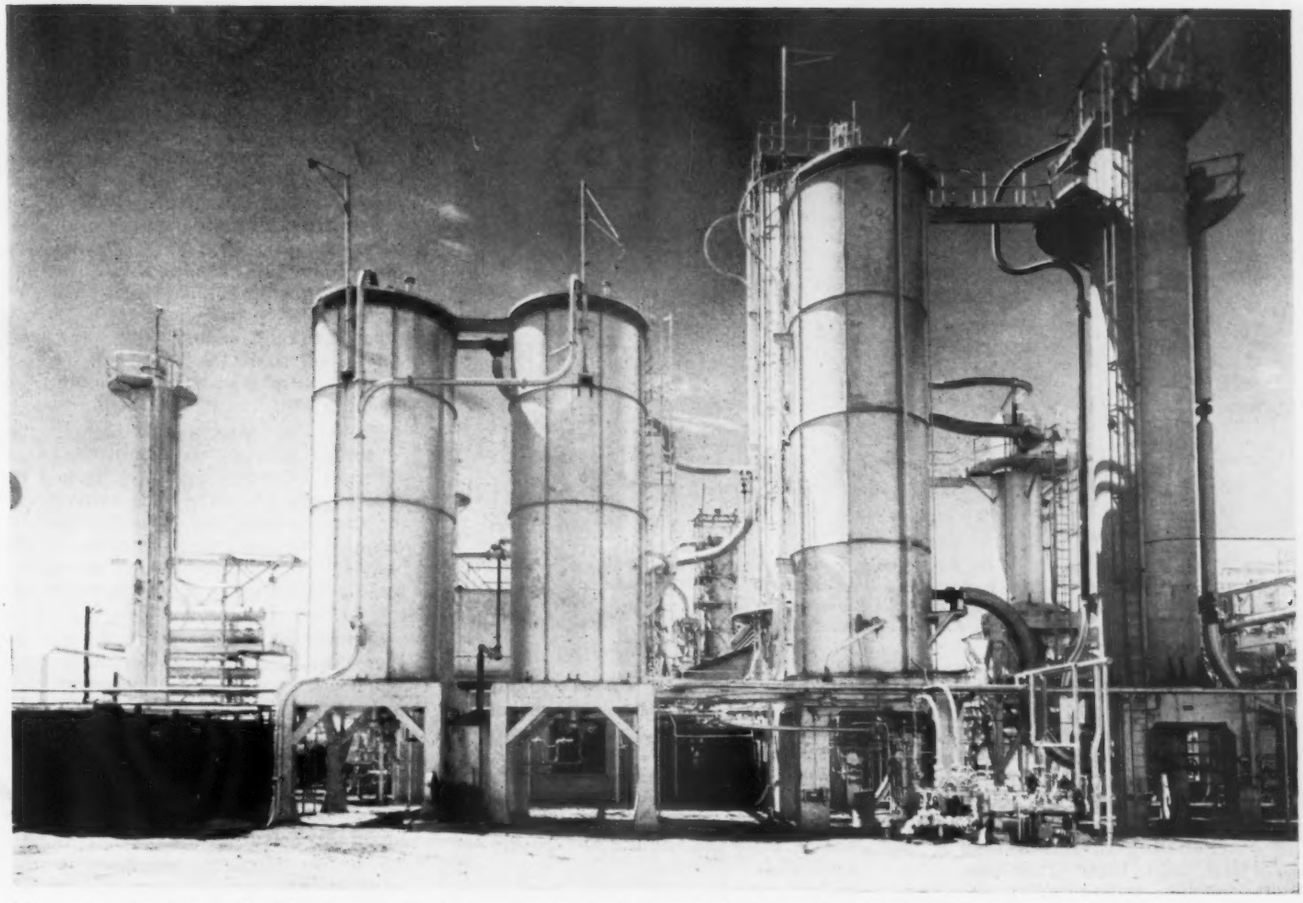

The reaction chambers at the right center receive the heated oil from the furnace coils, where the cracked charge then passes into the flash chamber, the pressure on the oil being reduced from 300 to 100 pounds before flashing in the chamber. The vaporized gasoline from the flash chamber goes to the fractionating tower and heavy residual fuel oil is drawn from the flash chamber bottom

734.
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Flexibility Prime Requisite Of Modern Refining Plant

By Arch L. Foster

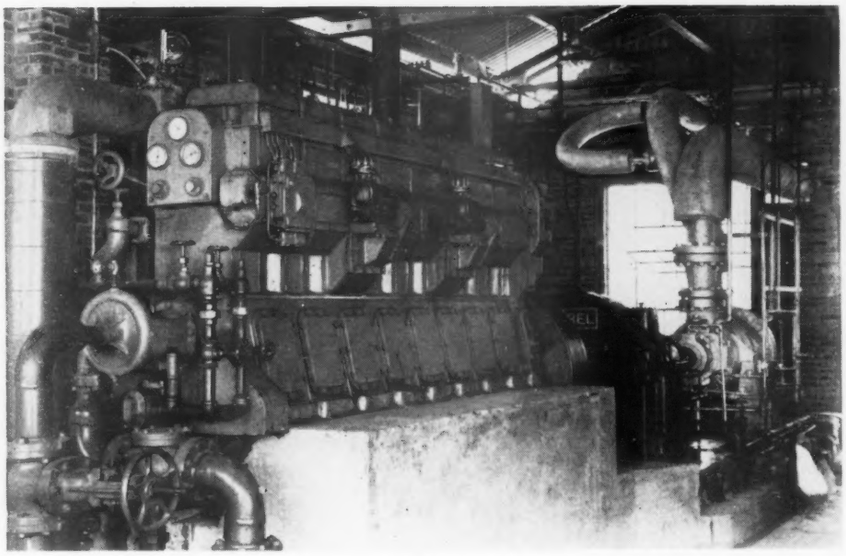
N. P. N. Technical Editor

Modern processes and equipment make it possible now for the relatively small refining plant to achieve the operating efficiency and flexibility necessary to meet today's competition. The plant described here is typical of the refineries which produce relatively higher yields from the crude run to their stills of motor fuels of the required octane number and other qualities.

By the installation of a new Dubbs multiple-coil cracking unit, and modernizing the older unit which has been operating some years, the refinery of Cosden Oil Co., at Big Spring, Texas, has been given the maximum of flexibility required in the modern refinery to meet manufacturing and market demands. With a present crude capacity of 14,000 barrels per day, the multiplicity of heaters, towers and other equipment give that plant the flexibility equivalent to a 17,000 barrel-per-day plant, company officials state.

The Cosden plant operates on West Texas crudes, most of which are relatively high in sulfur. With a high percentage of cracking of these crudes special equipment is necessary to meet the severe operating conditions and turn out satisfactory products. Alloy steels are required in still tubes, headers and other metal equipment in contact with the crude and distillates at the higher temperatures and pressures. Special treating equipment is necessary to properly process the raw materials to yield the most satisfactory finished products to meet commercial standards.

Some years ago the Cosden company built a Dubbs unit for processing these crudes, which has been operating since. To this older unit new centrifugal hot oil pumps have been added, and the present capacity of this unit is 5500 barrels of charging stock per day. The new unit was completed June 10, 1938, and charges 6500 barrels per day. It has two sets of heaters of the Equiflux type, with



To handle the very hot "recycle oil" or recycle stock in the refinery cracking unit, at temperatures which sometimes reach 600° F. or higher, this 8-cylinder gas engine drives a centrifugal pump at a speed of 3000 revolutions per minute. Two such engines and pumps are used in the new unit at the Cosden Petroleum plant

coils for cracking light or distillate oils and other coils for the heavy residual stock, consisting of reduced crude.

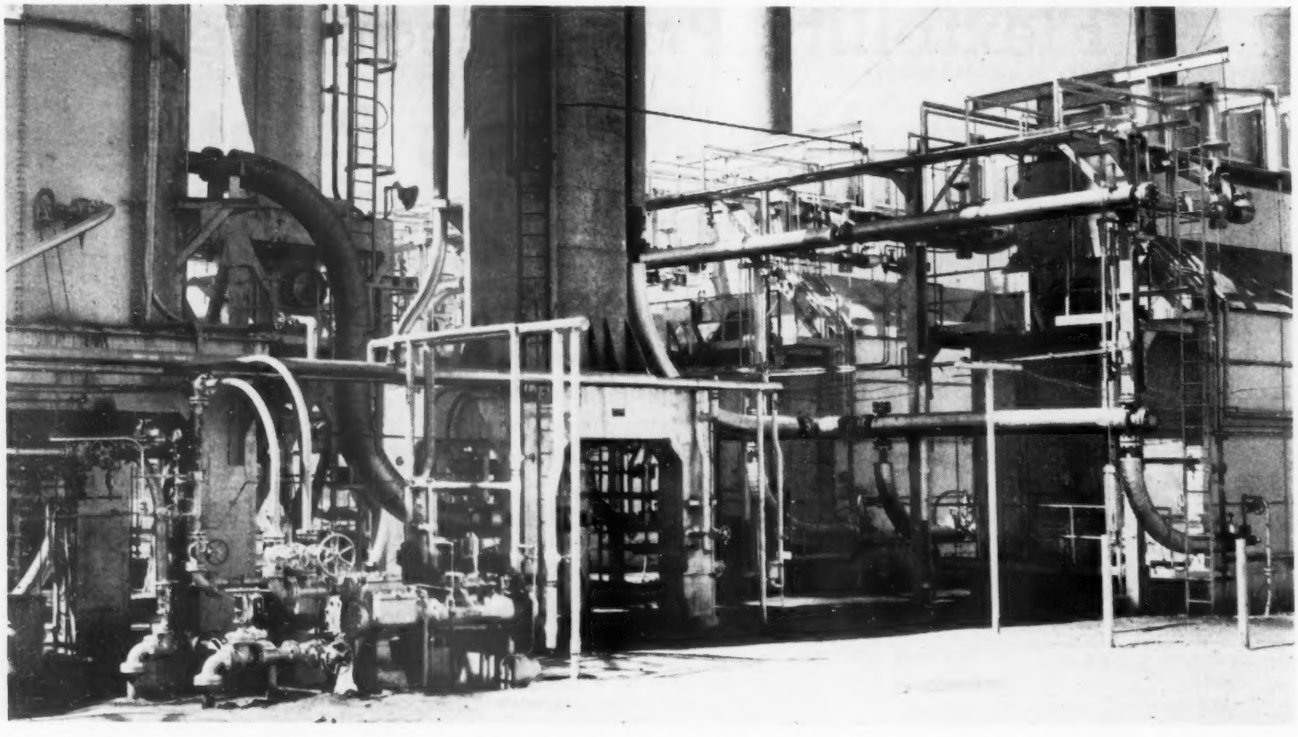
The raw crude passes through heat exchange equipment and is flashed along with topped crude directly into the fractionating column, where it is separated into three fractions. The light gasoline vapors from the raw crude pass up the tower along with the cracked gasoline vapors, to be fractionated to the desired endpoint motor fuel. The second fraction, a "gas oil" cut with about 600° F. endpoint, is drawn off the side of the tower to an accumulator tank, to be pumped to the two light oil cracking furnaces. The heavy tower bottoms are pumped directly to the heavy oil heaters.

The flow of the oil through the heavy and the light oil heaters is somewhat different. The light oil heaters are equipped with continuous coils of alloy tubes, 2¾ inches internal diameter by 26 feet long. The charges pass through these continuous coils and empty into the reaction chamber. The heavy oil heaters are equipped with parallel coils made up partly of 2⅝-inch and partly of 2¼-inch internal diameter tubes.

The heavy oil charge is split into two equal streams, each passing through one of these parallel coils, the two streams combining after passing through, and entering the common reaction chamber. By this arrangement the temperatures and pressures may be held at the conditions for producing gasoline of 72 octane number gasoline and higher without appreciable carbon deposition in the tubes, which deposit shortens the length of time the unit can be operated without shutting down for cleaning out.

From the reaction chamber the combined charges pass into the next or flash chamber and are flashed at 100 pounds pressure. The vapors enter the fractionating tower below the stripper section and pass upward, the heavier condensate below becoming recycle stock to re-enter the furnaces for further cracking.

Because so much of the success of operation of a modern cracking unit depends on exact and unvarying control of temperatures, pressures, flow rates and other conditions, this unit is completely equipped with automatic controls. Outlet or transfer line temperatures from the furnaces are controlled by a Foxboro Stabilog system, which controls the amount of gas to the heater burners, actuated by the transfer line temperature of the oil in passing from heater coil to reaction chamber. This control is interlocked with Mason-Neilan flow control valves on the heater oil inlets and



This maze of towers, piping, valves, pumps and furnaces make up the typical view of the modern refinery. Confusing to the layman, it is a simple and open book to the trained, experienced refining technologist on whom we depend for the best motor fuels. The plant is the new unit of Cosden Petroleum Corp., located at Big Spring, Texas

Five cents

That's the new rate per barrel throughput for Dubbs cracking in the United States, beginning October first

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

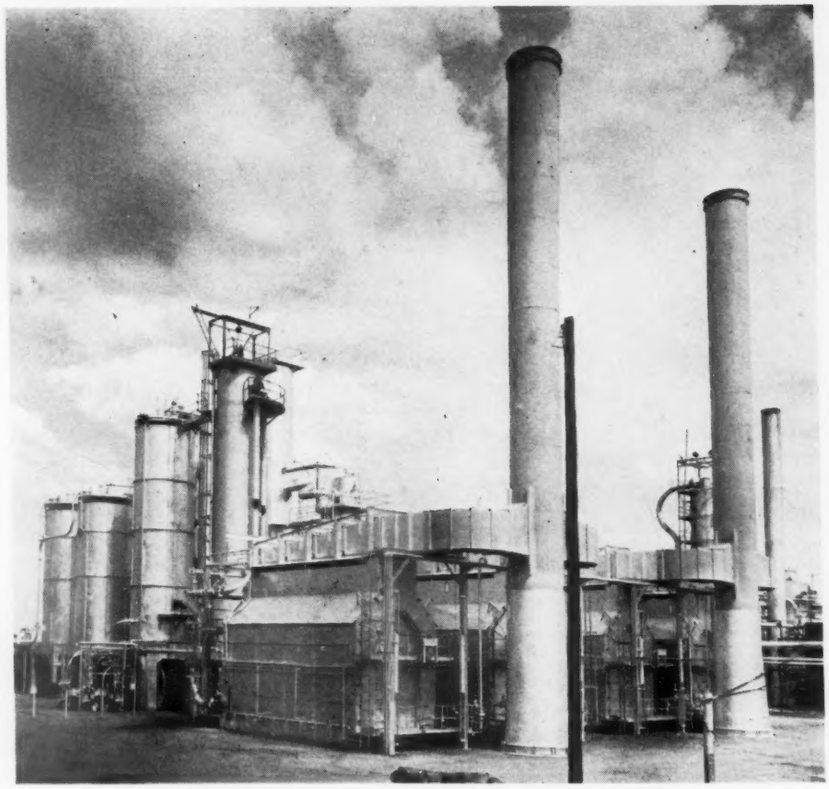
with Foxboro flow meter control systems on the charge to the unit coils. The four furnaces have six streams passing to the reaction chamber, and the temperatures of these streams are each controlled to within two degrees of the desired point.

The fractionating tower overhead temperature is also controlled by a Foxboro Stabilog control, which determines the amount of reflux, or liquid gasoline which is "pumped over" the top of the tower bubble trays to regulate the temperature of the vapors leaving the tower to be liquefied in the condensers.

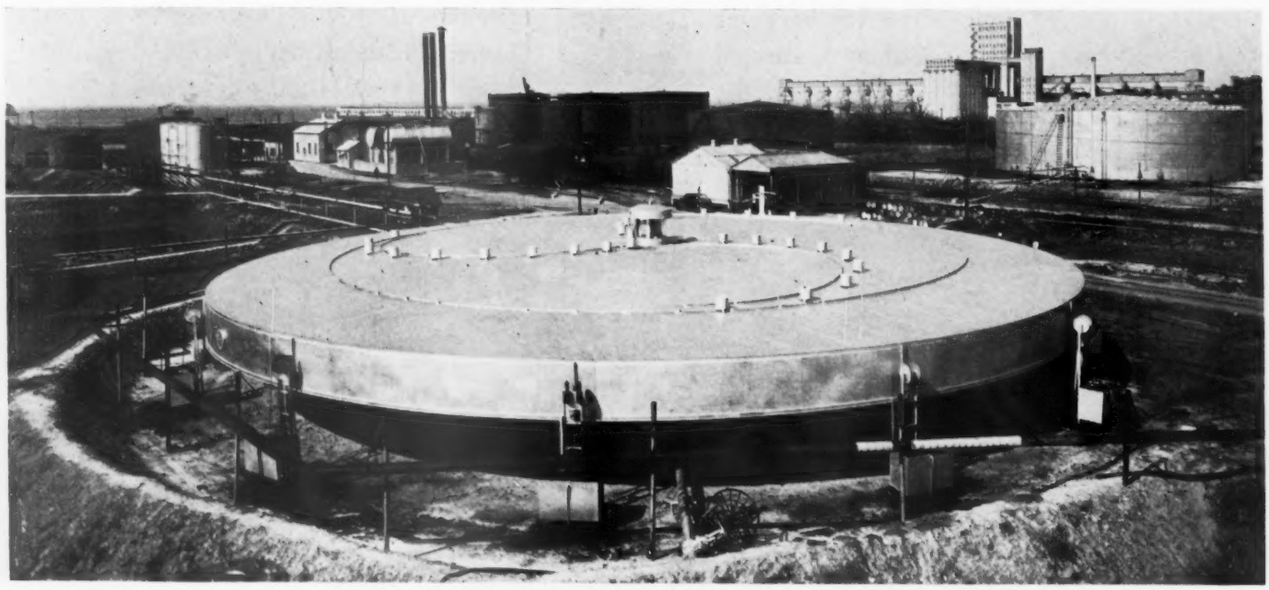
FROM the gasoline receiver tanks the raw gasoline is pumped to the stabilizer column after passing through heat exchangers, where the too volatile portions are removed and the gasoline reduced to the desired volatility. After stabilization the gasoline is cooled and washed with lime to remove hydrogen sulfide, and then is "sweetened" in a doctor sweetening unit also recently completed and designed to handle the output of the new cracking unit. The sweetened gasoline is reduced to the desired vapor pressure and distillation range and is then ready for storage and market.

The new unit at the Cosden plant was placed in operation June 15, 1938, after being tested with the customary high pressure air and water tests to discover and close any possible leaks in the newly fitted equipment. All expectations as to yield, and the octane number and other properties of the gasoline were exceeded on the initial run, company engineers state.

The success of any refining company is most likely to be governed by the efficiency of its processes and equipment, and the necessity for high yields of motor fuels with the required octane number and other qualities, makes it imperative that the refiner employ modern processes to the best advantage. The margin between costs of crude and refining and the market price of gasoline is small, and the difference of a fraction of a cent per gallon in the cost of manufacturing motor fuel may well be the difference between a profit and actual loss on the operation. The Cosden plant is typical of the most modern cracking plants being operated by refiners, using different systems and operating conditions but all marvels of efficiency in comparison to the plants built only a few years ago.



The new multiple heater Dubbs unit is the newest type of cracking plant for processing both light and heavy oils to produce gasoline, in the refinery of Cosden Petroleum Corp., Big Spring, Texas



Wiggins Balloon Roof on a tank battery at Sewell's Point, Va.

By locating piping and metering equipment overhead in this five-stall loading rack, Shell engineers have greatly improved efficiency and appearance. Loading rack aprons, hinged to each side of the main platforms, afford easy methods for getting on or off the truck. These aprons are raised out of the way when not in use

Large Scale Bulk Plant Promotes Efficient Handling

By Jack Westsmith

N. P. N. Staff Writer

LOOKING toward more efficient handling and distribution of petroleum products, bulk plant construction in metropolitan Pacific Coast marketing areas is emphasizing improvements in location, design and operating procedure.

For some time, the trend of bulk plant operation in areas of large concentrated consumption has been away from operating numerous small delivery depots and toward emphasis on distribution facilities to handle large volumes from a single main supply point.

A number of factors have contributed to this re-alignment of delivery systems, including the economies offered by wider use of larger payload tank trucks for making deliveries direct from refinery, marine terminal, or central bulk plant to important, large-capacity service stations.

In addition to eliminating double handling, with its attendant evaporation losses, several west coast marketing companies have found appreciable savings in transportation costs by operating their own large delivery trucks in this direct service.

Capacity of these units ranges upward of 4200 gallons completely equipped for metered deliveries. They operate within a radius of 50 miles of the supply point.

Supplementing this system is a fleet of smaller capacity trucks — 1800 to 2400 gallons, operating out of the central bulk plant and making deliveries to stations with limited storage capacity.

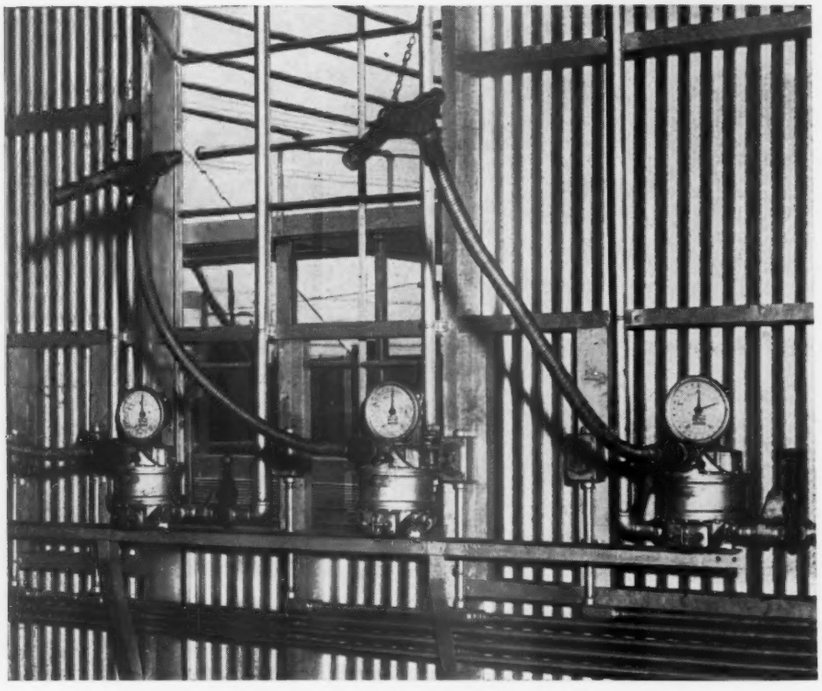
Fringe plants continue to find favor as supply points for the lighter equipment delivering to small dump stations in the outlying districts, with the transport equipment filling requirements of the larger customers.

This trend has resulted in fewer bulk plants, as a whole, but it has meant that the main delivery depot must have larger capacity and be capable of multiple loading of the smaller trucks and in some cases the transport units, in order to cut down idle time.

BECAUSE of the number of loads handled, operating procedure at the main plant dictates a closer check on products moving in and out, and a thorough analysis of factors contributing to evaporation or handling losses. These losses are minimized, however, by reason of the larger storage volume.

In line with this development of centralized distribution, Shell Oil Co. recently completed a new main bulk plant to serve the important Los Angeles marketing area; a plant combining operating safety features with efficient arrangement of facilities and illustrating the application of many improvements in construction detail.

Emphasizing the need for a com-



Individual 1¼-inch meters are used for drum and bucket filling of six special products distributed by this plant in the Los Angeles area. Chains hold the filling nozzles up out of the way when not in use—a feature promoting operating efficiency and cleanliness

plete pre-construction analysis of future demand requirements on any bulk delivery station, this plant was designed to allow for expansion, over and above a more than adequate provision for present needs.

Representing an over-all investment of approximately $400,000, this super bulk depot is located on a five-acre tract of land to the south of downtown Los Angeles in the direction of the company's southern California refining facilities.

This location reduces the over-lapping of distribution into the territory between the bulk plant and refinery, where gasoline consumption is relatively light, and makes for a shorter run by tank truck and trailer assemblies, supplying stocks to the plant.

Although built to facilitate large scale distribution to the company's service station outlets in an area approximately 15 miles wide and 20 miles long, the plant includes many features also applicable to small bulk plant operation.

Storage capacity for the necessary amounts of various products is provided by 30 tanks, located in a space completely surrounded by 8-foot concrete retaining walls capable of holding all the fluid content of the tanks.

Approximately 1,000,000 gallons of storage is devoted to the three grades of gasoline handled and includes one 500,000-gallon tank for the house brand and one 300,000-gallon unit for the third-grade product. In addition there are 19 tanks with 12,500 gallons capacity and nine with 25,000 gallons each. These hold stocks of lubricating oil and specialty products, such as solvent, lacquers, kerosene, and fuel oil.

Meter filling a drum with lubricating oil in Shell Oil Co.'s new Los Angeles bulk plant. Each of four meters in this service is manifolded to handle four grades of oil. The four "molasses-gate" valves shown below the meter installation are used to fill calibrated five-gallon buckets. Push-type, remote control pump switches are located on the steel framework within easy reach of the operator

THE tanks are all welded construction, aluminum painted, and set on concrete with a 2½-inch cushion of road oil and sand mix — about the same as desert mix for paving — between the concrete and tank bottom. This protects the metal against corrosion and makes for flexible stability of the foundation. All tanks are on foundations set into the ground 12 inches.

A large part of the stock for this storage is delivered to the plant in 6000-gallon truck and trailer assemblies and railroad spur facilities are provided for tank car delivery.

The truck discharge system allows two complete assemblies — 12,000 gallons — to be delivered simultaneously. Two 6-inch lines, one each for the house and third-grade brands of gasoline, are connected to storage through 500 g.p.m. centrifugal pumps, driven by 7½ hp. explosion-proof motors. The 12,000 gallons can be unloaded in 27 minutes.

An identical pumping hook-up is provided on these two grades of gasoline for loading trucks at the rack. This dual system permits unloading and loading operations to be carried on at the same time.

Ethyl gasoline is unloaded through a 4-inch line and two 3-inch lines handle other products delivered by truck and trailer. An important feature of this delivery system is the operating efficiency afforded by the close connection between the discharge point, the pumps, storage tanks and loading rack.

To get away from accumulation of vapor in the pump house and the attendant fire hazard, Shell engineers have sponsored an open-air pumping station. Here 26 pumps and motors are located in a compact group on a concrete floor, providing easy cleaning and repair. All pumps are operated by push buttons at the various discharge points.

The loading rack is arranged to

THOUGHTS now turn to meeting fall and winter requirements and—for over 90% of the refiners and compounders of paraffin base oils—that means Paraflow Pour Depressant. More than a billion gallons of oil have been treated with Paraflow Pour Depressant. If this were all automotive oil, it would be more than enough to supply two crankcase fillings of oil every winter for more than 10 years, to each of the 29,705,222 motor vehicles in the United States. The record tells its own story.

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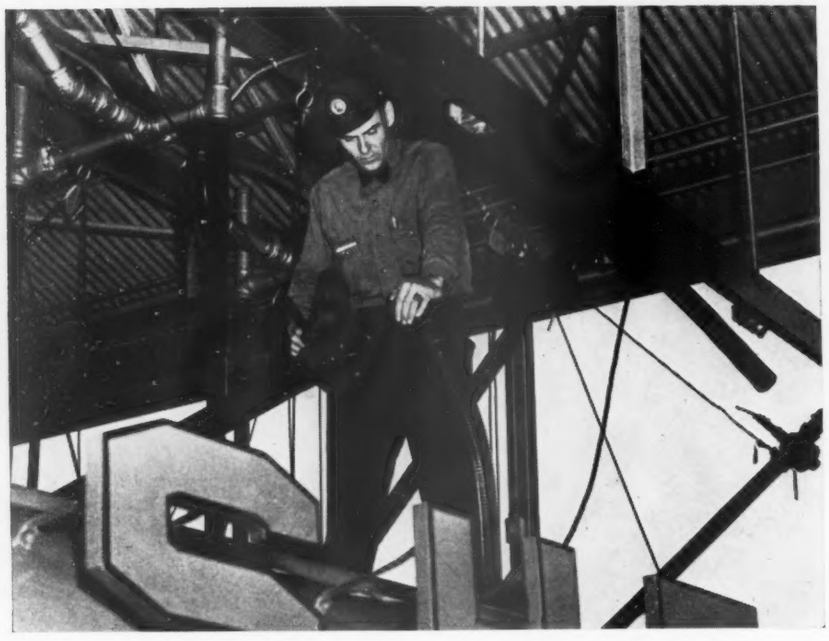

Although the plant is meterized, the truck compartments are loaded to markers in the dome and the quantity compared with readings on the meters, which are installed in connection with the overhead piping. Remote control push-type switches for operating the loading pumps are located on the horizontal bar suspended from the roof

load five tank trucks simultaneously — it takes about 10 minutes to load and check-out a 2400-gallon truck, largest normally operated from this yard.

A unique feature of the rack is the fact that all delivery lines from the pumps come in overhead, making for easy location of leaks and making of repairs. It is noteworthy that all piping in the plant is above ground for this reason. The loading lines are 3-inch for gasoline and 2½-inch for other products delivered in bulk from this rack.

Three brands of gasoline are delivered from each side of two double loading platforms, with fuel oil and special products loaded through a single rack, but all forming one compact and centrally located unit.

Considerations for additional safety of the loader are emphasized by use of loading rack aprons, four feet wide and 12 feet long — made of 2 by 12-inch planking. One of these is hinged to each side of the main loading platforms, giving somewhat the appearance of short wings on an airplane. Counter weighted, each apron can be raised out of the way of trucks coming into position for a fill.

The main rack platforms are eight feet above grade and the aprons can be lowered so that the loading operator can walk directly on to the top of the truck tanks. Rail-guarded steel stairs lead to the main deck, making it unnecessary for the operator to climb up and down the truck side.

Individual remote control of loading pumps is provided by positive acting, push-button type switches located on cross-members suspended from the roof of the loading rack and within easy reach of the operators during loading.

Inverted meters and dials on the incoming overhead lines are located immediately above the loader's head as he stands on the truck, facilitating accurate reading. Tank truck compartments are loaded to markers located in the tank dome and the quantity is then measured by the meter readings.

Submerged loadings of volatile products is a rule at this plant and is accomplished by use of flexible rubber hose coupled to the discharge nozzles, which are the pressure closing type and provide automatic shut-off in an emergency. Each loading arm is counter-balanced by a 40-pound weight.

A 6000-gallon truck and trailer unit can be unloaded in 15 minutes at Shell Oil Co.'s new Los Angeles bulk plant. Facilities permit two of these assemblies to discharge at the same time, with pumping arrangements geared to take 12,000 gallons in 27 minutes. Stubs on the incoming lines are labeled and painted with identifying colors as a guard against contamination

GENERAL appearance of this loading rack is greatly enhanced by the overhead location of piping and metering equipment, which eliminates much paraphernalia from beneath the loading platforms. Except for wood used in the decks and aprons, the rack is all steel and concrete construction, topped by an iron roof. The driveways are 6-inch concrete slabs and absolutely level.

Handy to the loading facilities is a checking office — a concrete building with a special room for drivers to fill out orders and invoices. In addition to a bookkeeping office for checking movement of products through the plant, this building also has a locker room, showers, and toilet facilities for benefit of the personnel.

Accurate check of products going out of this plant does not end at the loading rack. In a reinforced concrete lubricating oil warehouse, affording 12,000 feet of floor space, provisions are made for meter filling of drums with "lube" oils and special products.

This department is located at one end of the warehouse near the pumping station and tank storage, again illustrating pre-construction analysis of efficient operating procedure.

Metering equipment on the lubricating oil end consists of four 1½-inch units for handling 16 grades of

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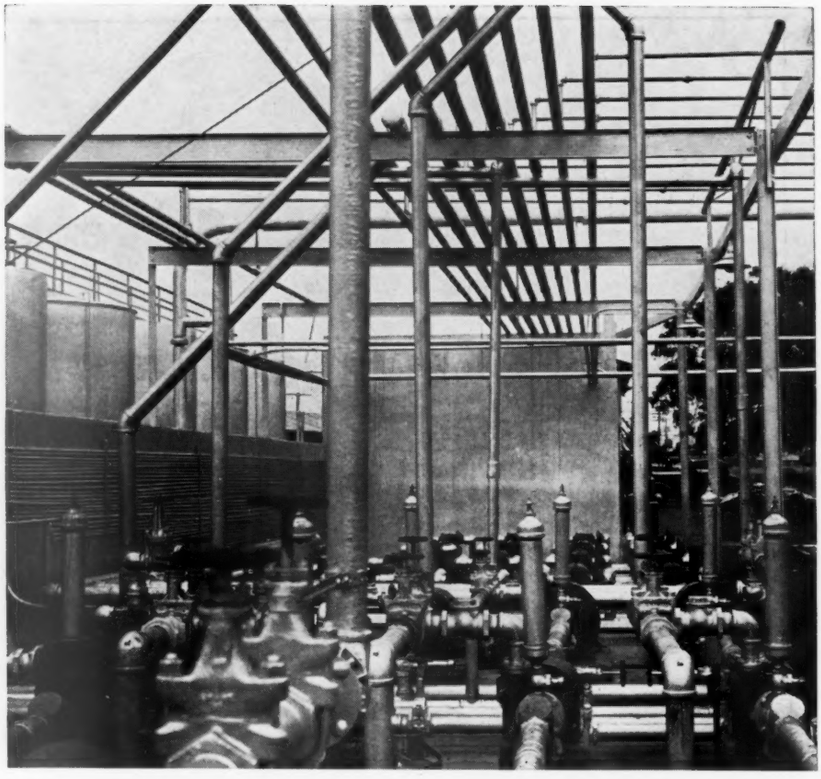
Warren, Pa.



A feature of Shell Oil Co.'s new 2,000,000-gallon capacity bulk plant in Los Angeles is this open-air pumping station. All pumps and motors used in unloading or loading 25 different products are located on this concrete island, a safeguard against vapor accumulation and attendant fire hazard

oil and so manifolded that four grades can be put through each meter without contamination. The oil is delivered under pressure through the metering equipment to the end of a flexible discharge tubing. Drums are filled to exact measurements shown on the meter dial.

A by-pass of the metering equipment is used in filling calibrated 5-gallon buckets for bulk lubricating oil delivered to service stations. This eliminates possible contamination of one grade of oil by about two quarts of the previous-run oil remaining on the discharge side of the meter.

There is a separate electric driven pump for each grade of oil, so that it can be delivered direct from storage to the individual discharge nozzle. These outlets — 16 in all — are the large, quick-acting "molasses-gate" type. A roller system along the floor beneath the nozzles makes for ease in handling filled buckets.

IN the same department there are six 1¼-inch meters for making accurate measurement of a like number of special products distributed in drums and buckets from this plant. Each product is again delivered by a separate pump and is discharged from nozzles on the end of a four-foot flexible metallic tubing connected to the meter outlet.

The nozzle end of each tubing is raised up out of the way, when not in use, by chains fastened to the wall behind the meters.

For both the lubricating oil and special product filling operation, efficient remote pump control for each grade of product is provided by push-type switches located alongside each discharge nozzle. In another section of the warehouse, but near this filling department, the company plans to add facilities for the quick and efficient cleaning of barrels; repainting and stenciling. Again the plant layout was designed with an eye toward reducing handling and movement of drums and other containers. These will be unloaded on one side of the warehouse, cleaned, fixed up, and filled by the time they have traveled across the 50-foot width of the building to a loading platform on the other side.

Automotive equipment operating out of this plant includes 14 trucks, 10 of which are on double shift — six 2400-gallon capacity and four 1500-gallon units. Four flat beds for "lube" oil delivery are operated on single shift.

The tank trucks average about 100 miles per shift and have four compartments — ranging from 300 to 600 gallons on the 2400-gallon units. These are emptied through two 2-inch meters equipped with two-way valves for putting two compartment contents through each meter.

A terminal building for receiving and shipping supplies required in the

oil fields covers a floor space of 5000 square feet. In addition there is a 4000 square-foot service building for automotive equipment.

A main office, housing approximately 45 employees, faces the street and adds to the general appearance of this plant. The building is wood frame and stucco construction.

Fire protection is provided by a complete system for mechanical mixing of foam powder with the water stream. A concrete building houses 10,000 pounds of powder and a cart carrying 300 feet of 3-inch hose. Personnel of this plant have two fire drills a month.

An extra touch to the plant is added by an 80-year-old Australian fig tree, which has a limb spread of about 125 feet. Reports have it that 13 men were hanged here for one reason or another during the early days of California.

TRADEMARKS

The following are trademark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Munsey Building, Washington, D. C., trademark specialists.

As an additional service feature to its readers, this journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering. You may communicate with the Editor of this Department, or send your inquiry direct to the National Trade-Mark Company, stating that you are a reader of this journal.

SPEED-FLO. Ser. No. 406,790. Wagner Specialty Company, Burlington, Wis. Filed May 26, 1938.

A BEAR FOR WEAR. Ser. No. 405,476. W. H. Barber Co., Minneapolis, Minn. Filed April 20, 1938.

For lubricating oils and greases.

MOTOR FIZIK. Ser. No. 405,594. The Curran Corporation, doing business as The Belmont Co., Malden, Mass. Filed April 22, 1938.

For lubricating oil having penetrating and solvent properties.

ROSE-X and design. Ser. No. 401,318. Roselux Chemical Co., Inc., New York City. Filed Dec. 28, 1937.

For liquid waxing compounds.

RUST-BAN. Ser. No. 405,209. Humble Oil & Refining Co., Houston, Tex. Filed April 13, 1938.

For coatings of the nature of lubricating liquids and lubricating greases.

MONOGRAM DCL. Ser. No. 405,488. The Distillers Company Limited, Edinburgh, Scotland. Filed April 20, 1938.

For liquid fuel for internal combustion engines.

LOWER CENTER of GRAVITY FOR ECONOMY - - - SAFETY

● BECAUSE a Fruehauf Tank-Trailer has no drive shaft, no differential to interfere with the manifold or piping of the tank, its center of gravity is naturally much lower than that of a heavy-duty straight truck—an important reason for its greater safety and economy.

GREATER ECONOMY

Its drop-frame, low-to-the-ground construction eliminates most of the surge and sway characteristic of gasoline in transit, does away with the top-heavy tendency of big straight truck bulk hauling equipment.

The less movement there is within any liquid load, the greater the efficiency attained by the power unit. This partially explains why Fruehauf Tank-Trailers roll along more easily than straight trucks of comparable capacity. A prominent SAE engineer states that Tank-Trailers require 20% less drawbar pull than straight trucks —a substantial saving in operating cost.

GREATER SAFETY

A low center of gravity is a valuable factor of safety in negotiating curves at trunk-line speeds, allowing the load to hug the road. And, over a period of time, the relative absence of sway and surge eliminates extra strain and stress from the entire unit —adding years to its life. Yet, should a leak for some reason develop in the tank, gasoline cannot drop or ignite on muffler or exhaust pipe—another of the Trailer's safety features. Easier steering results from the fact that the transfer of surge to the steering axle is interrupted, and to a large extent absorbed, by the rear wheels of the tractor. Surge, of course, is basically a lesser problem, anyway, with Trailer operation.

You'll appreciate the improved appearance of Fruehauf Tank-Trailers, too, with their sleek, streamlined styling and their rightful suggestion of strength and dependability.

OTHER ADVANTAGES

Add to these advantages of lower center of gravity the basic Trailer advantages, based on the ability of any power unit to PULL more than it is designed to CARRY —lower first cost, lower operating cost, bigger loads, flexibility, maneuverability —and you will understand why the Oil Industry bought 58% more Fruehauf Trailers in 1937 than in 1936.

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"Engineered Transportation" REG. U. S. PAT. OFF

MORE FRUEHAUFS ON THE ROAD THAN ANY OTHER MAKE

Business Girls' Club Runs Station's Opening Day

This unusual station crew consists of the members of a business girls sorority in Minot who walked into the office of R. J. Coughlin, head of the Westland Oil Co., independent marketer there, and made him a business proposition to take a station over on its opening day. The girls got the profits and the station got a resounding sendoff

A real idea for opening day for a service station presented itself to an independent marketer in Minot, N. D., when the business girls' organization there made him an offer to run the station for a day.

And the girls really "ran" it, doing all the work of servicing the cars, after first attending a short course at the company's training school. No merchandise was given away. Oil changes and grease jobs were sold for future delivery. The proceeds from the station's sales for the day went to the Girl Scouts. The station and the Westland Oil Co. achieved publicity they could not have received accompanying any commercial opening day.

So you are opening a new service station, or reopening a station after modernization, and you want to do it in a big way. With a bang-up opening day you figure the station will get off on the right foot, bring back a lot of the old customers and many new ones, and get off to a good sales stride.

Now there are many time honored ways of attracting a crowd to a station opening. You might advertise in the local newspapers and pass out handbills in the neighborhood. You might offer favors — flowers for the ladies, smokes for the men, toys or candy for the children. You might make it a gala day, with the mayor or some other celebrity, making an appearance. Then again you might offer a free grease job or crankcase drain with the purchase of so many gallons of gasoline.

But for a new idea, there is the opening of a remodeled station of Westland Oil Co., independent marketer, in its home city of Minot, N. D.

Opening day of this station found an organization of business women in charge, four shifts of pretty girls handling the gasoline hose, checking crankcase oil levels, inflating tires, filling radiators, and looking for opportunities to sell accessories.

All profits, wholesale and retail, that day went to the girls, and were for construction of an over-night cabin for the Girl Scouts of Minot.

The remodeling job was nearing completion and R. J. Coughlin, president, was casting about for an opening day idea, when the idea walked into his office, in the form of a committee from the Theta chapter of Beta Sigma Phi, a national educational sorority. The sorority, composed of business girls in Minot, offered to take over the station for one day, making that the opening day for the station.

Coughlin quickly saw the possibilities of the idea and snapped up the offer. Chris Mostad, the station lessee, joined in the opening day plan. The sorority was to take over the operations and to promote the opening day; the oil company and lessee relinquished their profits.

Equally alert was the sorority in preparing for the opening. The girls attended a special sales school conducted by the Westland organization, to learn how to service automobiles and how to sell petroleum and accessory products.

When the news got around Minot that the Beta Sigma Phi girls were going to "man the pumps" at the

N.P.N. says this is an advertisement but we say it's National Petroleum News

This jobber station at Ashland, Wisconsin, is selling over 100,000 gallons a year

Thriving Jobbing Business Started During Depression

IS IT "old stuff" to talk about the depression? We don't think so. The ideas that made good during depression times are likely to "bring home the bacon" when times are good.

In February, 1933—remember?—the Chequamegon Oil Company of Ashland, Wisconsin, started in the jobbing business. During the 11 remaining months of that depression year they sold 172,000 gallons of petroleum products.

Not a bad record.

Yet the next year they had an increase of nearly 100,000 gallons, and they have shown similar increases during 1935, 1936, and 1937. The first year their main station in Ashland sold 50,000 gallons; in 1934 sales were 70,000; in 1935, 95,000; and it is now pumping well over 100,000 gallons a year.

John J. Bloomquist, manager of Chequamegon Oil Company, explains the company's remarkable "depression growth" in the following letter:

"We have found that dealer and consumer acceptance is easy to get and to hold, and that your aggressive advertising campaign and jobber cooperation in local advertising has paid big dividends. Our oil sales have increased 330 per cent over the first year. Our customers like Phillips 66 oil and our sales are showing a continual increase. We have never seen the need of handling any petroleum products other than those sold by your company, and have found the quality unsurpassed.

"Needless to say, we are very well satisfied with the Phillips 66 line, and wish to thank you for the splendid cooperation we are receiving from the company and from your sales representative."

Ashland is a city of less than 11,000 population and there are 11 oil companies within the city limits, yet the Chequamegon Oil Company—selling Phillips 66 products—is now in second place, and Mr. Bloomquist states confidently that "we have first place as our goal."

They will make it, too, and so can you if you are sales-minded and will accept the Phillips franchise. We are eager to help make you the No. 1 jobber in *your* territory. Just write, wire, or phone

PHILLIPS PETROLEUM CO.
Bartlesville, Oklahoma

Chicago Minneapolis St. Louis
Indianapolis Des Moines Omaha
Peoria Kansas City Wichita
Tulsa Amarillo

Westland one-stop station, the event was dubbed "Gal's Day" and this slogan stuck.

Local newspapers, the week before the opening, carried a special section on the event, plus advertisements from companies that had supplied building materials for the station and from other firms offering congratulations. Green colored handbills were distributed and the event was announced on news broadcasts from two radio stations in Minot.

The day before the opening the Girl Scouts' Drum and Bugle Corp led a parade through Minot's business district and also played at the station during the opening day afternoon.

THE girls took a short, but thorough, course in station operation to be prepared to properly service automobiles. It started off with a sales meeting conducted by C. D. Bruce, Westland Oil Co., sales manager, explaining all the merchandise carried in the station and the proper methods of suggestion selling.

Then the sales school continued with practical experience. The girls were divided into shifts and serviced cars in a Westland station. This part of the training included actual handling of a gasoline hose, checking oil and radiators and inflating tires.

"Really we found out there is a right and a wrong way to wash windshields," reported Hazel Balerud, sorority president.

The opening day was on a Sunday, so the sorority's activity did not conflict with the regular jobs of the girls. That day found the girls taking over the station and four shifts, of five girls each, manned the pumps from 7 a. m. to 10:30 p. m. Each girl was given a definite assignment. On each shift there was a supervisor in charge, distributing the printed handbills explaining the purpose of the "Gal's Day" and greeting the customers. The supervisor also collected the money and brought the change from the cashier.

Two girls on each shift were responsible for gasoline and tires and two for checking crankcases and washing windshields. The "oil girls" also checked radiators and fan belts, also wiper blades and lights.

When business was brisk the girls divided into groups of two each, each group handling one automobile. When customers came in one at a time "deluxe" service was offered, with four girls working on one car.

As a competition stimulator Coughlin offered three prizes, $3, $2, and $1, to the shifts coming in first, second and third on gasoline sales exceeding a quota. The 7 a. m. trick nearly doubled its quota and won the $3 first prize money.

To handle the volume of business, lubrication, car washing and crankcase services were sold on a deferred delivery basis. Tickets were printed for these jobs and sold only on opening day. The girls collected for the tickets and retained 50 per cent of the proceeds. The purchaser returned for the service, the tickets being good until Jan. 1.

Deferred selling turned out to be a real sales stimulant on these three services. If a customer replied that "I just had my car washed and greased" the sales girl came back on future service.

Customers would be told; "That is just fine, because we haven't the time today to wash or grease your car and then too you would not want to be without your car today. However, by buying one of these tickets today, at no advance in price, you will be helping the Girl Scouts and you can come in anytime before Jan. 1 and have your car serviced."

In practically every instance the customer bought at least one ticket and many bought all three.

TO aid the opening the Westland Oil Co. distributed flowers, cigarets, and books of matches from a booth display of the U. S. Tire Co.

When the opening day came to an end in the late evening the pumps showed 1518 gallons of gasoline had been sold. This, Coughlin estimates, is about four times normal sales on a Sunday as the station, being in a business district, normally does not have heavy Sunday patronage.

Lubricating oil sales came to 39 gallons, for a ratio of 2.6 to gasoline sales. Tips amounted to over $1.50, indicative of how motorists liked the "Gal's Day" service.

The cash register was manned for the entire opening day, without relief, by Pearl Anderson, sorority treasurer, and at closing time the

Westland Oil Co., independent marketer, remodeled its No. 1 station in Minot, N. D., by removing the canopy, putting a new front on the building and enclosing the service bays. The two photographs illustrate the striking improvement and the greater working efficiency achieved

check-out showed the quantities sold and cash came out exactly even.

A report from Miss Balerud, the opening day general manager, who spent most of the time with a chamois washing windows and windshields, showed gross profits of $143.29, less $41.55 for advertising expenses, a net of $101.74 to be turned over to the Girl Scouts' building fund.

From the jobber's view point Coughlin reports; "The 'gals' did a swell job and the opening day of our No. 1 Minot super service station was a huge success in every way."

While the company had foregone all profits of the day Coughlin said he felt he could have spent several times that amount of profit in the ordinary line of advertising and not have acquired as much in good will nor brought the station to the attention of the public to anywhere near the extent that was achieved in this novel opening.

New Patents

Compiled by R. E. Burnham, patent and trademark attorney, 511 Eleventh Street, N. W., Washington, D. C., from whom copies may be obtained at the rate of 25c each. State number of patent and name of inventor when ordering.

August 9, 1938

REFINING

Method of producing gasoline—Charles B. Hillhouse, New York, N. Y., Filed July 20, 1935. No. 2,125,921.

Process of producing valuable polymers from olefine mixtures—Stewart C. Fulton, Elizabeth, N. J., and Thomas Cross, Jr., Baton Rouge, La., assignors to Standard Oil Development Co. Filed Dec. 30, 1935. No. 2,126,001.

Process of using hydrogenated solvents for dewaxing oils—John V. Starr, Cranford, N. J., assignor to Standard Oil Development Co. Filed Nov. 1, 1934. No. 2,126,055.

Conversion of hydrocarbon oils—Jacque C. Morrell, Chicago, Ill., assignor to Universal Oil Products Co. Filed Sept. 28, 1935. No. 2,126,204.

Conversion of hydrocarbon oils—Kenneth Swartwood, Chicago, Ill., assignor to Universal Oil Products Co. Filed Feb. 15, 1937. No. 2,126,229.

Process of manufacturing gasoline; catalyst and process of making; process of manufacturing gasoline or other liquid hydrocarbons, and catalyst—James R. Rose, Edgeworth, Pa., assignor of three-fourths to Michael L. Benedum and Joseph C. Trees, Pittsburgh, Pa. Filed Nov. 19, 1936, Dec. 2, 1936, Feb. 3, 1937, and Feb. 3, 1937. Nos. 2,126,281, 2,126,282, 2,126,283, and 2,126,284.

Process for refining vegetable oils and like—Siegfried Langedijk and Willem Coltof, Amsterdam, Netherlands, assignors to Shell Development Co. Filed May 15, 1937. No. 2,126,334.

Process of breaking emulsions—Ivor

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The Fleet-Wing program is based upon one idea—that the independent merchant . . . particularly in the petroleum marketing industry . . . is a most important factor and becoming more so than ever. For fifteen years this has been the only premise of Fleet-Wing business.

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Some territory is open for the Fleet-Wing Distributorship. Wire or phone us to find out if your territory is available.

The Fleet-Wing Plan Provides

- No competition from your supplier
- An independent jobber brand
- A complete line of Quality products
- An assured source of supply
- Continuous sales and merchandising cooperation
- Building and reconstruction service
- A program that builds profitable volume

FLEET-WING CORPORATION, CLEVELAND, OHIO

Fleet-Wing Golden Gasoline—Fleet-Wing Ethyl—Fleet-Wing Certified Motor Oil—Fleet-Wing 100% Pennsylvania Motor Oil—Fleet-Wing Specialized Automotive Lubricants—Fleet-Wing Fuel Oil—Fleet-Wing Farm and Tractor Oils and Greases—Fleet-Wing Specialties.

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Author is Raymond Walter McKee, C. P. A., formerly an oil company executive; now associated with accounting firms specializing in oil accounting.

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ERIE PA.

HAYS

M. Colbeth, East Orange, N. J., assignor to Baker Caster Oil Co. Filed Apr. 6, 1934. No. 2,126,368.

Process and apparatus for producing lower boiling products from mineral oils—William G. Leamon, New York, N. Y., assignor to Houdry Process Corp. Filed Dec. 8, 1930. No. 2,126,400.

Method for heating and fractionating hydrocarbon oils—Charles W. Stratford, Paris, France, assignor to Stratford Development Corp. Filed Dec. 18, 1933. No. 2,126,420.

Process for treatment of hydrocarbon oil—Percival Keith, Jr., Peapack, N. J., assignor to Gasoline Products Co. Filed Jan. 25, 1935. No. 2,126,472.

Process for dewaxing mineral oils—Donald S. McKittrick, Oakland, and Hiliary J. Henriques, Berkeley, Calif., assignors to Shell Development Co. Filed Oct. 21, 1935. No. 2,126,493.

Process for refining mineral oils—Edmond R. P. E. Retailliau and Joseph B. Wyman, Wood River, Ill., assignors to Shell Development Co. Filed Dec. 11, 1933. No. 2,126,503.

MISCELLANEOUS

Hydrocarbon resin process—Maurice H. Arveson, Chicago, Ill., assignor to Standard Oil Co. (Ind.) Filed Mar. 9, 1937. No. 2,125,872.

Diesel fuel—Daniel P. Barnard IV, Hammond, Ind., assignor to Standard Oil Co. (Ind.) Filed Apr. 17, 1935. No. 2,125,875.

Lubricating oils—Leo Liberthson, New York, N. Y., assignor to L. Sonneborn Sons Inc. Filed Mar. 3, 1936. Nos. 2,125,934, 2,125,935, and 2,125,936.

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Refineries: **Oil City, Pa.; Emlenton, Pa.; Farmer's Valley, Pa.; St. Mary's, W. Va.**
Ocean Terminals: **Baltimore, Md.; Tiverton, R. I.; Dorchester, Mass.; Carteret, N. J.; Edgewater, N. J.; Glastonbury, Conn.; Philadelphia, Pa.**

Markets

Mid-Continent

TULSA, Aug. 22.—Several Oklahoma refiners late last week announced 0.125-cent reductions in their U. S. Motor gasoline quotations. Open market competition for business was keen, they said. Volume of gasoline moving against contracts was reported heavy, with open market deliveries light.

North and West Texas refiners also reported 0.125-cent reductions in their quotations for gasoline on an f.o.b. Group 3 basis, but announced no change in prices for local or differential shipment.

The expected upturn in kerosine demand failed to materialize, and several Oklahoma and Kansas refiners announced reductions in quotations for this product.

Mid-Continent and South Texas lube markets were featureless. Wax demand was active with limited supplies reported available for immediate shipment.

Gulf

NEW YORK, Aug. 22.—Sale of a cargo of approximately 65,000 barrels of 64-66, 375 e.p., 60-octane gasoline, for September-October lifting, made late last week to a European buyer, was confirmed by the seller today. Price was not divulged but it was said to be in the neighborhood of 4.625 to 4.75 cents a gallon.

This is the first transaction reported in the open export market in several weeks. The buyer also purchased a quantity of 70 octane leaded gasoline for the same lifting at 5.375 cents, f.o.b. the Gulf, the seller said.

Gas oil continued to be relatively well held at a low of 3.5 cents, traders said. Kerosine was reported in good shape at 4 cents.

Heavy fuels were quiet and reports were that minimum 10 gravity Bunker C oil could be had at under $0.625 per barrel.

Mid-Western

CHICAGO, Aug. 22.—Several marketers reported 0.125-cent reduction in their purchases for all grades of gasoline the past week. Jobber demand against contracts continued active throughout the week, reports indicated. Supplies were reported freely available as spot business in metropolitan area continued to lag.

One Michigan refiner reported advancing his quotation for straight run gasoline 0.125 cent early in the week. All grades were in good demand and lower inventories were reported by most refiners.

Quotations for 41-43 and 42-44 kerosine were reduced 0.125 cent to 4.25 and 4.375 cents, respectively, by several Chicago marketers. Michigan kerosine movement continued steady with prices generally unchanged, according to reports.

California

LOS ANGELES, Aug. 20.—Suppliers active in the Pacific export market were looking for September inquiry to lift demand for bulk petroleum products out of the doldrums. One cargo of diesel oil was reported sold Atlantic foreign but price was not learned.

Slightly higher prices for diesel and gas oil were reported as demand for substantial quantities of these commodities for blending purposes cleaned out many so-called distress lots.

Fuel oil demand continued to drag, with sales reported at less than 50 cents a barrel on some low gravity, high sulfur products in the Basin. One large supplier doubted that a good quality fuel would bring more than 70 cents on the open market, compared to nominal quotations of 85 to 90 cents.

Pennsylvania

CLEVELAND, Oct. 22.—Little change was reported in the general market situation in western Pennsylavania last week. Lubes continued active with prices tending higher, according to sellers' reports. They also indicated gasoline was fairly active, kerosine slow, and fuel oil tight.

Quotations of refiners for 25 pour test bright stock and 150 vis. neutral oil were reported up 0.5 cent with the former at 13.5 to 14 cents, and the latter, 13 to 13.5 cents.

Two upper field refiners offering 36-40 fuel oil said their quotations were 0.125 cent higher at 4 cents.

N.P.N. Gasoline Index

	Dealer T.w. Cents per	Tank Car gal.
Aug. 22	10.14	6.07
Month ago	10.24	6.13
Year ago	10.67	6.74

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 12 wholesale markets for regular-grade gasoline.

Eastern

NEW YORK, Aug. 22.—Gasoline continued to be freely offered at eastern saboard terminals, with prices reported easier the week ended Aug. 20.

Offerings of high octane gasoline at 6.5 cents for tank car lots in the Philadelphia market were reported Aug. 17. Buying in this market was virtually at a standstill and the same was true at Boston, New York, and Baltimore, suppliers said.

Shading of 6.25 cents for high octane gasoline in barge lots was heard in the New York harbor market throughout the week. Actual sales, or firm offerings at under this price, however, could not be confirmed.

Wax

NEW YORK, Aug. 22.—Some wax suppliers said they were asking 5 to 10 points higher for white crude scale grades, for export and domestic shipment, in the New York market the week ended Aug. 20.

Offerings of both scale and refined grades, however, were relatively free at unchanged prices from other suppliers. Shipments were relatively slow, sellers said.

Fuel Oil

CHICAGO, Aug. 22.—Jobber inquiry for light fuels continued active the past week and some marketers said many contracts covering next winter's storage needs had already been signed. Scarcity of Nos. 2 and 3 fuel oils was reported by some sellers.

Inquiry for Michigan light fuels continued active and a shortage was reported at some plants.

Industrial fuel demand continued slack, according to most Chicago brokers. Heavy fuel movement from the southwest was negligible, they said. Scarcity of heavy fuels was reported by some Michigan refiners with demand better from industrial plants. Quotations generally remained unchanged, according to reports.

* * *

NEW YORK, Aug. 22.—Fuel oil prices generally were steady at eastern seaboard points, according to reports the third week of August. Interest in this product started to expand as the 1933-39 heating oil season approached.

Price of 4.25 cents was reported in most markets for No. 2 oil in tank cars. This grade was 0.125 cent lower in New York harbor for barge shipment.

* * *

TULSA, Aug. 22.—"Exploratory" inquiries for light fuels and industrial oils featured the Mid-Continent fuel oil market last week. Few of these inquiries developed into actual business, refiners said. Supplies were freely available for immediate shipment, and stocks at most Mid-Continent plants were increasing, refiners said.

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). Prices in cents per gallon except heavy fuel oils in dollars per barrel of 42 gallons, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included, unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Gasoline

Prices Effective	Aug. 22	Aug. 15
OKLAHOMA		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.625– 5.00	4.75 – 5.00
63-66 oct.	4.875– 5.125	5.00 – 5.125
67-69 oct.	5.125– 5.50	5.25 – 5.50
70-72 oct.	5.375– 5.75	5.50 – 5.75
60-62, 400 e.p.	4.75	4.75 – 4.875
WESTERN PENNA.		
Bradford-Warren:		
Motor gasoline:		
U. S. Motor (58-62°)	(h)5.375	(h)5.375
Min. 65 oct.	(h) 7.00 –7.25	(h) 7.00 –7.25
Min. 70 oct.	(e)7.50	(e)7.50
"Q" gasoline	(g)7.25	(g)7.25
Other districts:		
Motor gasoline:		
U. S. Motor (58-62°)	4.75 – 5.00	4.75 – 5.00
Min. 65 oct.	7.00	7.00
"Q" gasoline	(g)7.25	(g)7.25
CENTRAL MICHIGAN (a)		
Str.-Run Gasoline	(c) 5.00 –5.375	(c) 5.00 –5.375
U. S. Motor: (Octane L-3)		
67-69 octane	(e)7.50	(e)7.50
70-72 octane	8.00 – 8.125	8.00 – 8.125
CALIFORNIA (3c tax to be added if used in state)		
U. S. Motor:		
54-58, for instate shipment	6.75 – 9.25	7.00 – 9.25
54-58, for outside state shipment	7.00 – 9.00	7.00 – 9.00
58-61, 375-400 e.p., 65 oct. & above	7.75 – 9.75	7.75 – 9.75
N. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.75 – 5.00	4.75 – 5.00
63-66 oct.	5.00 – 5.50	5.00 – 5.50
67-69 oct.	5.25 – 5.625	5.25 – 5.625
70-72 oct.	5.625– 5.75	5.625– 5.75
60-62, 400 e.p.	4.75	4.75
KANSAS (For Kansas destinations only)		
U. S. Motor: (Octane L-3)		
62 oct. & below	5.00 – 5.25	5.00 – 5.25
70-72 oct.	5.75 – 6.00	5.75 – 6.00
W. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.875– 5.00	4.875– 5.00
63-66 oct.	5.125– 5.25	5.125– 5.25
67-69 oct.	5.50 – 5.625	5.50 – 5.625
70-72 oct.	5.75 – 5.875	5.75 – 5.875
E. TEX.		
60-62, 400 e.p.	4.50 – 4.625	4.50 – 4.625
N. LA. (For shipment to La. & Ark.)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.75	4.75
63-66 oct.	(e)5.125	(e)5.125
67-69 oct.	(e)5.25	(e)5.25
70-72 oct.	5.75	5.75
ARKANSAS (F.o.b. Ark. plant of one refiner, for shipment to Ark. & La.)		
U. S. Motor: (Octane L-3)		
62 octane & below	5.00	5.00
67-69 oct.	5.50	5.50
OHIO (Quotations of S. O. Ohio. Delivered anywhere in Ohio).		
U. S. Motor	8.375	8.375
Above 65 oct.	8.625	8.625

Natural Gasoline

(Prices to blenders on freight basis shown below. Shipments may originate in any Mid-Continent manufacturing district.)

F.O.B. GROUP 3		
Grade 26-70	3.25	3.25
F.O.B. BRECKENRIDGE		
Grade 26-70	3.25	3.25
CALIFORNIA (F.o.b. plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	6.50 – 7.00	6.50 – 7.00

Kerosine

Prices Effective	Aug. 22	Aug. 15
WESTERN PENNA.		
Bradford-Warren:		
45 w.w.	(h) 5.125–5.25	5.125– 5.25
46 w.w.	(e)5.25	(h)5.25
Other districts:		
45 w.w.	4.875– 5.00	4.875– 5.00
46 w.w.	(h)5.00	(h)5.125
47 w.w.	5.125– 5.25	5.125– 5.25
CENTRAL MICHIGAN (a)		
47-49 w.w.	5.00 – 5.05	5.00 – 5.05
OKLAHOMA		
41-43 w.w.	4.00 – 4.25	4.125– 4.375
42-44 w.w.	4.375– 4.625	4.375– 4.625
KANSAS (For Kansas destinations only).		
41-43 w.w.	4.375– 4.625	4.50 – 4.625
42-44 w.w.	4.625– 5.00	4.75 – 5.00
N. TEX. (b)		
41-43 w.w.	4.25 – 4.50	4.25 – 4.50
N. LA. (For shipment to La. and Ark.)		
41-43 w.w.	4.125– 4.50	4.125– 4.50
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
41-43 w.w.	4.625	4.625
CALIFORNIA		
40-43 w.w.	5.00 – 7.00	5.00 – 7.00

Gas *and* Fuel Oils

WESTERN PENNA.		
Bradford-Warren:		
36-40	(h)4.00	(h)4.00
Other districts: (Excluding Pittsburgh District Prices).		
36-40	(h) 3.75 –4.00	(h) 3.75 – 4.00
CENTRAL MICHIGAN (a)		
P.W. Distillate	4.50 – 4.75	4.50 – 4.75
No. 3 gas oil, Str.	4.25 – 4.50	4.00 – 4.50
U.G.I. gas oil	4.00 – 4.25	4.00 – 4.25
Fuel Oils (Vis. at 100):		
500-700 Vis.	2.375– 2.75	2.375– 2.75
300-500 Vis.	2.50 – 3.00	2.50 – 3.00
100-300 Vis.	2.625– 3.25	2.75 – 3.25
OKLAHOMA		
No. 1 prime white	3.75 – 4.00	3.75 – 4.00
No. 2 straw	3.50 – 3.625	3.375– 3.625
U. G. I. gas oil	(e)3.25	(d) 3.00 –3.25
28-30 zero fuel	3.25 – 3.50	3.25 – 3.375
24-26 fuel	(e)$0.925	(e)$0.925
18-22 fuel	(d) $0.75-$0.80	(d) $0.75-$0.80
14-16 fuel	(d)$0.70	(d)$0.70
KANSAS (For Kans. destinations only).		
No. 1 p.w. fuel oil	4.125	4.125
10-14 fuel oil	$0.45 –$0.80	$0.45 –$0.80
N. TEX. (b)		
No. 1 Prime white	(e)4.00	(e)4.00
N. LA. (For shipment to La. and Ark.)		
20-24 fuel	(e) $1.10-$1.15	(e) $1.10-$1.15
16-20 fuel	(e) $0.90-$0.95	(e) $0.90-$0.95
10-14 fuel	(e) $0.80-$0.85	(e) $0.80-$0.85
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
No. 2 fuel	3.625	3.625
28-30 gas oil, zero	3.375	3.375
CALIFORNIA		
San Joaquin Valley:		
Heavy fuel	$0.60 –$0.75	$0.60 –$0.75
Light fuel	$0.75 –$0.85	$0.75 –$0.85
Diesel fuel (per gal.)	3.50 – 4.00	3.50 – 4.00
Stove dist. (per gal.)	3.75 – 6.00	3.75 – 6.00
Los Angeles:		
Heavy fuel	$0.50 –$0.90	$0.50 –$0.90
Light fuel	$0.65 –$1.00	$0.65 –$1.00
Diesel fuel (per gal.)	2.50 – 4.00	2.50 – 4.00
Stove dist. (per gal.)	2.75 – 6.00	2.75 – 6.00
San Francisco:		
Heavy fuel	$0.95	$0.95
Light fuel	$1.05	$1.05
Diesel fuel (per gal.)	4.50	4.50
Stove dist. (per gal.)	6.50	6.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Neutral Oils

Prices Effective	Aug. 22	Aug. 15
WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)		
Viscous Neutrals No. 3 col. (Viscosity at 70° F.)		
200 Vis. (180 at 100°) 420-425 fl.		
0 p.t.	(h)17.00	(e)17.00
10 p.t.	(h)16.00	(e)16.00
15 p.t.	(h)15.50	(e)15.50
25 p.t.	14.00 –15.00	14.00
150 Vis. (143 at 100) 400-405 fl.		
0 p.t.	(h)16.00	(e)16.00
10 p.t.	(h)15.00	(e)15.00
15 p.t.	(h)14.50	(e)14.50
25 p.t.	13.00 –14.00	13.00
SOUTH TEXAS		
Vis. Color		
Pale Oils: (*Vis. at 100°F.*)		
100 No. 1½-2½	4.75 – 5.25	4.75 – 5.25
200 No. 2-3	6.25	6.25
300 No. 2-3	6.75	6.75
500 No. 2½-3½	7.75	7.75
750 No. 3-4	8.25	8.25
1200 No. 3-4	8.75	8.75
2000 No. 4	9.00 – 9.25	9.00 – 9.25
Red Oils:		
200 No. 5-6	6.25	6.25
300 No. 5-6	6.75	6.75
500 No. 5-6	7.75	7.75
750 No. 5-6	8.25	8.25
1200 No. 5-6	8.75	8.75
2000 No. 5-6	9.00 – 9.25	9.00 – 9.25

Note: Red oil prices cover oils with green cast; blue cast red oils are slightly lower in some cases.

MID-CONTINENT (Vis. at 100° F.; F.o.b. Tulsa basis).

Pale Oils: (0 to 10 P.P.)		
Vis. Color		
60-85—No. 2	5.50	5.50
86-110—No. 2	6.00	6.00
150—No. 3	9.00	9.00
180—No. 3	10.00	10.00
200—No. 3	10.50	10.50
250—No. 3	11.50	11.50
280—No. 3	12.50	12.50
300—No. 3	13.00	13.00
Red Oils:		
180—No. 5	(e)9.00	(e)9.00
200—No. 5	9.50 –10.00	9.50 –10.00
280—No. 5	11.50 –11.75	11.50 –11.75
300—No. 5	(e)11.75	(e)11.75

Note: The following oils, of 15 to 25 p.p., are generally quoted these amounts under 0-10 p.p.; viscous oils, 0.5c; non-viscous, 0.25c. Viscous oils (150-300 vis.), No. 4 color, generally are quoted 0.5c above No. 5 color oils.

CHICAGO (Vis. at 100° F.)

Pale Oils 0 to 10 p.p.:		
Vis. Color		
60-85—No. 2	7.25	7.25
86-110—No. 2	7.75	7.75
150—No. 3	10.00	10.00
180—No. 3	11.00	11.00
200— .3	11.50	11.50
250—No. 3	12.50	12.50
Red Oils:		
180—No. 5	10.00	10.00
200—No. 5	10.50	10.50
250—No. 5	11.50	11.50
280—No. 5	12.50	12.50
300—No. 5	12.75	12.75

Note: Viscous oils, 15 to 30 p.p. are quoted 0.5c lower; 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., 0.25c lower. To obtain delivered prices in Chicago, add 0.25c per gal.

Cylinder Stocks

MID-CONTINENT (F.o.b. Tulsa basis)		
Bright Stocks:		
190-200 Vis. at 210 °D.	(e)19.00	(e)19.00
150-160 Vis. at 210 °D:		
0 to 10 p.p.	14.25 –16.00	14.25 –16.00
10 to 25 p.p.	13.50 –15.50	13.50 –15.50
25 to 40 p.p.	13.50 –15.00	13.50 –15.00
150-160 vis. at 210° E.	12.50 –15.00	12.50 –15.00

(a) Prices f.o.b. Central Michigan refinery group basis, for shipment within Mich. Shipments may originate at plants outside Central group. (b) For shipment to Texas and New Mexico destinations; Group 3 prices quoted on northern shipments. (c) Excluding Detroit shipment. (d) Nominal. (e) One refiner queting. (f) No quotations reported. (g) To resellers holding licenses. (h) Two refiners quoting.

Marathon Lubricants have shown a steady increase in sales, regardless of general business conditions, indicating an increasing preference by motorists everywhere.

This has been due to the excellence of Marathon Lubricants and the methods of merchandising, distribution, advertising and sales policies.

Jobbers with Marathon Products to sell can be sure of getting their share of the sales ---- and profits! Investigate now! Write, Phone or Wire for complete particulars.

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LINCO

THE OHIO OIL COMPANY

GENERAL OFFICES - - - - FINDLAY, OHIO

ROBINSON, ILLINOIS TULSA, OKLAHOMA FT. WORTH, TEXAS

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days) unless otherwise stated. Prices in cents per gallon, except heavy fuel oils in dollars per barrel of 42 gallons, wax and petrolatums in cents per pound in barrels, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Cylinder Stocks (cont'd)

Prices Effective	Aug. 22	Aug. 15
Mid-Continent (cont'd)		
120 Vis. at 210° D		
0 to 10 p.p.	14.50 –15.125	14.50 –15.125
25 to 40 p.p.	(e)14.25	(e)14.25
600 S.R. Dark Green	5.00 – 7.50	5.00 – 7.50
600 S.R. Olive Green	6.50 – 7.50	6.50 – 7.50
631 S.R.	(e)12.50	(e)12.50
Black Oil	3.50 – 4.00	3.50 – 4.00
CHICAGO (Viscosity at 210°)		
Unfiltered Steam Refined:		
140	9.00	9.00
160	10.00	10.00
200	11.00	11.00
Bright stocks, 160 vis. at 210. No. 8 color:		
0 to 10 p.p.	15.75	15.75
15 to 25 p.p.	14.75	14.75
30 to 40 p.p.	14.25	14.25
E filtered Cyl. Stock	13.50	13.50

Note: To obtain prices delivered in Chicago, add 0.25c per gal.

Prices Effective	Aug. 22	Aug. 15
WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)		
600 S.R. filterable	8.00 – 8.50	8.00 – 8.50
650 S.R.	10.00 –11.50	10.00 –11.50
600 fl.	10.50 –12.50	10.50 –12.50
630 fl.	13.00 –14.00	13.00 –14.00
Bright stock, 145-155 vis. at 210°, 540-550 flash, No. 8 color:		
10 p.t.	15.50 –17.00	15.50 –17.00
15 p.t.	15.00 –16.00	(e) 15.00–16.00
25 p.t.	13.50 –14.00	13.50 –14.00

Petrolatums

Prices Effective	Aug. 22	Aug. 15
WESTERN PENNA. (In bbls., carloads; in tank cars, 0.5c less)		
Snow White	6.125	6.125
Lily White	5.125	5.125
Cream White	4.125	4.125
Light Amber	2.50 – 2.625	2.50 – 2.625
Amber	2.25 – 2.375	2.25 – 2.375
Red	2.00	2.00

Wax

Prices Effective	Aug. 22	Aug. 15
WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only. In bbls., carloads, New York)		
122-124 A.m.p., w.c. scale	(e)2.40	2.30 – 2.40
124-126 A.m.p., w.c. scale	2.30 – 2.40	2.30 – 2.40
OKLAHOMA (In bbls. or burlap bags, carloads)		
124-126 A.m.p., w.c. scale	2.35	2.35
CHICAGO (In bags, carload lots. Melting points are E.M.P. (A.S.T.M.) methods; add 3° F. to convert into A.m.p.)		
Fully refined:		
122-124	4.00	4.00
125-127	(d)4.10	(d)4.10
127-129	(d)4.45	(d)4.45
130-132	(d)4.75	(d)4.75
132-134	(d)5.00	(d)5.00
135-137	(d)5.75	(d)5.75

(a) Nominal. (b) Only one refiner quoting. (c) No price reported. (d) Same prices quoted in bags or slabs loose. (e) Two refiners quoting.

MID-WESTERN TANK CAR MARKET

(Prices group 3 basis; origin of shipments unknown)

Gasoline

Prices Effective	Aug. 22	Aug. 15
U. S. Motor: (Octane L-3)		
62 oct. and below	4.375– 4.875	4.375– 5.00
63-66 oct.	4.50 – 5.125	4.625– 5.25
67-69 oct.	4.75 – 5.25	4.75 – 5.375
70-72 oct.	5.00 – 5.625	5.00 – 5.625

Kerosine

41-43 w.w.	3.50 – 4.25	3.50 – 4.375
42-44 w.w.	3.625– 4.375	3.625– 4.50

(a) Nominal.

Fuel and Gas Oils

Prices Effective	Aug. 22	Aug. 15
Domestic:		
No. 1 p.w.	3.50 – 4.00	3.50 – 4.00
No. 1 straw	3.375– 3.75	3.375– 3.75
No. 2 straw	3.125– 3.75	3.125– 3.625
No. 3	3.00 – 3.375	3.00 – 3.375
No. 5	Discont'd.	(a) $0.65-$0.75
Range oil	3.625– 4.125	3.625– 4.125
Industrial:		
No. 5	(a) $0.60-$0.70	(a) $0.60-$0.65

Prices Effective	Aug. 22	Aug. 15
Industrial (cont'd)		
No. 6	(a) $0.40-$0.50	(a) $0.40-$0.50
U. G. I. gas oil	(a) 2.875–3.125	(a) 2.875–3.00

Naphtha and Solvent

Stoddard solvent	5.875	5.875
Cleaners' naphtha	6.375	6.375
V. M. & P. naphtha	6.375	6.375
Mineral spirits	5.375	5.375
Rubber solvent	6.375	6.375
Lacquer diluent	7.375	7.375

DAILY GASOLINE PRICES

Daily range of gasoline prices as reported in PLATT'S OILGRAM (Week Ended Aug. 19, 1938)

U. S. Motor, (Octane Number determined according to L-3 Method in Okla., Texas and Mid-Western Districts):	Aug. 15	Aug. 16	Aug. 17	Aug. 18	Aug. 19
62 octane and below:					
Oklahoma	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.625– 5.00
(b) North Texas	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00
West Texas	4.875– 5.00	4.875– 5.00	4.875– 5.00	4.875– 5.00	4.875– 5.00
Mid-Western (Group 3 basis)	4.375– 5.00	4.375– 5.00	4.375– 5.00	4.375– 5.00	4.375– 4.875
63-66 octane:					
Oklahoma	5.00 – 5.125	5.00 – 5.125	5.00 – 5.125	5.00 – 5.125	4.875– 5.125
(b)North Texas	5.00 – 5.50	5.00 – 5.50	5.00 – 5.50	5.00 – 5.50	5.00 – 5.50
West Texas	5.125– 5.25	5.125– 5.25	5.125– 5.25	5.125– 5.25	5.125– 5.25
Mid-Western (Group 3 basis)	4.625– 5.25	4.625– 5.25	4.625– 5.25	4.625– 5.25	4.50 – 5.125
67-69 octane:					
Oklahoma	5.25 – 5.50	5.25 – 5.50	5.25 – 5.50	5.25 – 5.50	5.125– 5.50
(b)North Texas	5.25 – 5.625	5.25 – 5.625	5.25 – 5.625	5.25 – 5.625	5.25 – 5.625
West Texas	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625
Mid-Western (Group 3 basis)	4.75 – 5.375	4.75 – 5.375	4.75 – 5.375	4.75 – 5.375	4.75 – 5.25
70-72 octane:					
Oklahoma	5.50 – 5.75	5.50 – 5.75	5.50 – 5.75	5.50 – 5.75	5.375– 5.75
(b)North Texas	5.625– 5.75	5.625– 5.75	5.625– 5.75	5.625– 5.75	5.625– 5.75
West Texas	5.75 – 5.875	5.75 – 5.875	5.75 – 5.875	5.75 – 5.875	5.75 – 5.875
Mid-Western (Group 3 basis)	5.00 – 5.625	5.00 – 5.625	5.00 – 5.625	5.00 – 5.625	5.00 – 5.625
Motor Gasoline, 60-64 octane:					
New York harbor	(a)6.50 –6.75	(a)6.50 –6.75	(a)6.50 –6.75	(a)6.50 –6.75	(a)6.50 –6.75
Philadelphia district	(a)6.50	(a)6.50	(a)6.50	(a)6.50	(a)6.50
Baltimore district	(a)6.50	(a)6.50	(a)6.50	(a)6.50	(a)6.50
Motor Gasoline, 65 octane & above:					
New York harbor	(a)6.50 –7.00	(a)6.50 –7.00	(a)6.50 –7.00	(a)6.50 –7.00	(a)6.50 –7.00
Philadelphia district	(a)6.75	(a)6.75	(a)6.75	(a)6.50 –6.75	(a)6.50 –6.75
Baltimore district	(a)6.75	(a)6.75	(a)6.75	(a)6.75	(a)6.75
U. S. Motor, 58-62°:					
Bradford-Warren (Western Penna.)	(e)5.375	(e)5.375	(e)5.375	(e)5.375	(e)5.375
Other districts (Western Penna.)	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00
Motor Gasoline, Min. 65 octane:					
Bradford-Warren (Western Penna.)	(e)7.00 –7.25	(e)7.00 –7.25	(e)7.00 –7.25	(e)7.00 –7.25	(e)7.00 –7.25
Other districts (Western Penna.)	7.00	7.00	7.00	7.00	7.00
Motor Gasoline, Min. 70 octane:					
Bradford-Warren (Western Penna.)	(c)7.50	(c)7.50	(c)7.50	(c)7.50	(c)7.50
"Q" Gasoline:					
Bradford-Warren (Western Penna.)	(d)7.25	(d)7.25	(d)7.25	(d)7.25	(d)7.25
Other Districts (Western Penna.)	(d)7.25	(d)7.25	(d)7.25	(d)7.25	(d)7.25

(a) Nominal. (b) For shipment to Texas and New Mexico destinations: Group 3 prices are quoted on northern shipment.
(c) One refiner quoting. (d) To resellers holding licenses. (e) Two refiners quoting.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Aug. 22, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. New Jersey

Essolene
(Regular Grade)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
*Atlantic City, N. J.	7.4	9.4	4	8
*Newark, N. J.	7.4	9.4	4	8
Annapolis, Md.	8.35	9.85	5	9.5
Baltimore, Md.	7.75	9.25	5	9
Cumberland, Md.	9.15	11.65	5	10
Washington, D. C.	8	9.5	3	9.5
Danville, Va.	8.45	10.95	6	12.9
Norfolk, Va.	7.25	9.75	6	11.5
Petersburg, Va.	7.55	10.05	6	11.7
Richmond, Va.	7.55	10.05	6	11.7
Roanoke, Va.	8.75	11.25	6	12.9
Charleston, W. Va.	8.55	11.05	6	12.6
Parkersburg, W. Va.	7.85	9.35	6	11.2
Wheeling, W. Va.	8.85	10.25	6	12.2
Charlotte, N. C.	9.15	11.65	7	12.1
Hickory, N. C.	9.65	12.15	7	12.5
Mt. Airy, N. C.	9.45	11.95	7	12.3
Raleigh, N. C.	8.75	11.25	7	11.6
Salisbury, N. C.	9.25	11.75	7	12.2
Charleston, S. C.	7.75	10.25	7	10.6
Columbia, S. C.	8.75	11.25	7	11.6
Spartanburg, S. C.	9.45	11.95	7	12.4

Discount to undivided dealers: Dealer t.w. price less 0.5c per gal.

*Effective June 21, 1938, S. O. New Jersey posted a minimum retail resale price of 11.9c at these two points.

Note: While the above posted prices continue in New Jersey, dealers will pay a net price of 8.9c per gal. for Essolene. Dealers having pumps marked only Esso, Essolene and "Standard" White gasoline will pay 8.4c per gal. for Essolene.

Price basis to commercial consumers: To contract accounts, purchasing at least one full compartment at a time by hose connection: Effective March 12, 1937, in New Jersey, and March 8 in Maryland, District of Columbia, and in Arlington and Fairfax Counties in Virginia, on yearly purchases: from 2,500 to 100,000 gals., consumer t.w. price at time and place of delivery; 100,000 gals. per year consumer tank car price, plus 0.5c per gal. Generally consumer t.w. price in foregoing states is equivalent of dealer t.w. price, less 0.5c per gal.

Effective May 15, 1937, on Essolene and Esso (by tank wagon) in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax Counties, which see above), commercial consumers taking deliveries of 50 gals. (West Va. 100 gals.) or more at one time will be billed at the posted consumer t.w. price. Deliveries less than 50 gals. (West Va. 100 gals.) will be billed at 4c per gal. over posted consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Kerosine Discount: 1c off t.w. price for 25 gals., or more, under contract thru territory (Baltimore City contract not necessary) except no discount in state of New Jersey.

Socony-Vacuum Oil Co., Inc.

(S. O. New York Division)

Socony Mobilgas
(Regular Grade)

	Consumer Tank Car	"Split" Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Metropolitan N. Y. City: Boroughs of Manhattan, Bronx and Brooklyn (Kings and Queens)	7.5	8.9	*5	8
Borough of Richmond (Staten Is.)	7.5	8.9	*5	8
Albany, N. Y.	7.8	9.8	5	8.5
Binghamton, N. Y.	9	10	5	9
Buffalo, N. Y.	8.4	9.5	5	8
Jamestown, N. Y.	8.1	10.6	5	8.25
Plattsburg, N. Y.	8.3	10.3	5	9.5
Rochester, N. Y.	8.5	10.3	5	8.5
Syracuse, N. Y.	8.1	9.5	5	9
Danbury, Conn.	8.1	10.1	4	9
Hartford, Conn.	7.9	9.9	4	7
New Haven, Conn.	7.8	9.8	4	7
Bangor, Me.	8.25	10.3	5	9
Portland, Me.	7.75	10	5	8.75
Boston, Mass.	7.50	9	4	8
Concord, N. H.	8.6	10.5	5	9
Lancaster, N. H.	9.7	12	5	10.25
Manchester, N. H.	8.3	10	5	8.5
Providence, R. I.	7.50	9	4	8
Burlington, Vt.	8.4	10.4	5	9.5
Rutland, Vt.	8.6	10.7	5	9

*Plus 2% city sales tax computed at time of each sale.

Discount to undivided dealers: 0.5c less than "split" dealer t.w.

Price basis to commercial consumers: Effective about Nov. 15, 1936 in New York and New England for tank wagon delivery: monthly purchases of 25,000 gals. or over, pay consumer tank car price at point of delivery, plus 0.5c gal.; monthly purchases of 5,000 to 25,000 gals., pay undivided dealer tank wagon price at point of delivery; monthly purchases of less than 5,000 gals., pay divided dealer tank wagon price at point of delivery. Private consumers pay undivided dealer tank wagon price at point of delivery, plus 2c gal.

Atlantic Refining

Atlantic White Flash Gasoline
(Regular Grade)

	Commercial Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Philadelphia, Pa.	7	8.25	5	10
Pittsburgh	8	10	5	10.5
Allentown	7.75	9.25	5	10.5
Erie	8	9.5	5	10
Scranton	8	9.5	5	10.5
Altoona	8	10	5	10.5
Harrisburg	7.5	9	5	10.5
Williamsport	8	10	5	10.5
Dover, Del.	...	8.5	5	10.5
Wilmington	...	7.5	5	9.75
Boston, Mass.	...	9	4	8
Springfield, Mass.	...	9.5	4	8
Worcester, Mass.	...	9	4	8.5
Fall River, Mass.	...	9	4	8
Hartford, Conn.	...	9.6	4	7
New Haven, Conn.	...	9.5	4	7
Providence, R. I.	...	9	4	8
Atlantic City, N. J.	...	8.60	4	8
Camden, N. J.	...	8.60	4	8
Trenton, N. J.	...	8.60	4	8
Annapolis, Md.	...	9.85	5	9.5
Baltimore, Md.	...	9.25	5	9
Hagerstown, Md.	...	10.35	5	10
Richmond, Va.	...	10.05	6	11.7
Wilmington, N. C.	...	10.35	7	10.8
Brunswick, Ga.	...	10	7	*13
Jacksonville, Fla.	...	8.5	8	11

*Georgia has kerosine tax of 1c per gal., not included in above price.

Discount to undivided dealers: Dealer t.w. less 0.5c per gal. except in Georgia and Florida, dealer t.w. and undivided dealer price is same.

Price basis to commercial consumers: consumers under contract, in Penna. and Delaware, effective Mar. 11, 1937, on yearly gasoline purchases taking full compartment hose deliveries, using 100,000 gals. or more per year, tank car price plus 0.5c per gal.; consumers taking less than 100,000 gals., undivided dealer price. Consumers under contract and not under contract, taking less than full compartment delivery, and consumers not under contract taking full compartment delivery, get divided dealer price. Consumers taking less than 25 gals., t.w. delivery, get 4c above undivided dealer price.

Discount on kerosine: Effective Oct. 29, 1936, in Pennsylvania and Delaware, 2c per gal. off t.w. price on t.w. deliveries of 25 gals. or more at one time.

S. O. Ohio

Sohio X-70 Gasoline
(Regular Grade)

	Consumer T.W.	†Divided Dlr.	Gasoline Taxes	Kerosine T.W.
Ohio State-wide	11.5	10.5	5	*12
Counties where prices are below statewide: Butler, Clark, Clinton, Columbiana, Defiance, Greene, Knox, Montgomery, Pickaway and Preble:	11	10	5	....
Hamilton	11	9.5	5	....
Franklin and Paulding:	10.5	9.5	5	....

Renown Gasoline
(Third Grade)

Ohio State-wide	11	10	5	....
Counties where prices are below statewide: Hamilton	11	9.5	5	....
Clark, Columbiana, Defiance, Knox and Pickaway	10.5	9.5	5	....
Franklin and Paulding:	10	9	5	....
Counties where prices are above statewide: Clermont, Darke, Miami and Warren:	11.5	10.5	5	....

S. O. Ohio Cont'd

Kerosine Prices

(Off Statewide Level)

Kerosine prices are off statewide level in the following counties:

Allen, Auglaize, Champaign, Columbiana, Darke, Geauga, Greene, Hardin, Logan, Mahoning, Mercer, Preble, Putnam, Shelby, Trumbull and Van Wert	*11.5
Paulding	*11
Ashtabula	*10.5
Fayette, Madison, Pickaway, Portage and Summit	*8.5

†This price also to authorized agents, exclusive of 0.5c rental. Discount to undivided dealers: 0.5c less than divided dealer t.w.

*Ohio has kerosine tax of 1c per gal., not included in above prices.

Commercial Tank Wagon Q.D.A. to contract accounts: Effective Oct. 20, 1937, thru Ohio (except in 30 counties), on monthly purchases, off posted consumer t.w. price: 0 to 999 gals., 0.5c; 1,000 to 19,999 gals., 1.5c; 20,000 gals. and over, 2.5c. The 30 counties where Q.D.A. differs from statewide are: Allen, Ashtabula, Auglaize, Butler, Champaign, Cuyahoga, Darke, Defiance, Erie, Fulton, Geauga, Hamilton, Hancock, Hardin, Henry, Logan, Lorain, Lucas, Mahoning, Mercer, Ottawa, Paulding, Putnam, Sandusky, Scioto, Shelby, Trumbull, Van Wert, Washington, Williams and Wood.

Sales tax: Ohio's 3% sales tax, effective Jan. 27, 1935, is added "where assessable, to regular posted prices," S. O. Ohio says.

On kerosine, prices to resellers and commercial consumers are posted generally at 3c per gal. below consumer t.w. price in any quantity, when such prices are on statewide level.

S. O. Kentucky

Crown Gasoline
(Regular Grade)

	Consumer T.W.	Net Dlr.	Gasoline Taxes	Kerosine T.W.
Covington, Ky.	12	9	6	10.5
Lexington, Ky.	13.5	10.5	6	10
Louisville, Ky.	13	10	6	10
Paducah, Ky.	10.5	7.5	6	10
Jackson, Miss.	12.5	9.5	7	*10
Vicksburg, Miss.	13	10	7	*9.5
Birmingham, Ala.	13.5	10.5	*8	12
Mobile, Ala.	12.5	9.5	*9	9
Montgomery, Ala.	12.5	10.5	*9	*11.5
Atlanta, Ga.	12	9	7	*12
Augusta, Ga.	12.5	9.5	7	*11
Macon, Ga.	14	11	7	*11.5
Savannah, Ga.	12.5	9.5	7	*11
Jacksonville, Fla.	12.5	9.5	8	8
Miami, Fla.	12.5	9.5	8	12.5
Pensacola, Fla.	12	9	*9	12
Tampa, Fla.	12.5	9.5	8	10.5

Kyso Gasoline
(Third Grade)

Covington, Ky.	10.5	8	6	....
Lexington, Ky.	12	9.5	6	....
Louisville, Ky.	11.5	9	6	....
Paducah, Ky.	9.5	7	6	....
Jackson, Miss.	10.5	8	7	....
Vicksburg, Miss.	10.5	8	7	....
Birmingham, Ala.	11.5	9	*8	....
Mobile, Ala.	10.5	8	*9	....
Montgomery, Ala.	11.5	9	*9	....
Atlanta, Ga.	10	7.5	7	....
Augusta, Ga.	11	8.5	7	....
Macon, Ga.	12.5	10	7	....
Savannah, Ga.	9.5	7	7	....
Jacksonville, Fla.	11	8.5	8	....
Pensacola, Fla.	10.5	8	*9	....
Tampa, Fla.	11	8.5	8	....

Discounts to all tank wagon consumers: Effective Jan. 4, 1937, thru territory, on Crown gasoline, 3c per gal. below consumer t.w. price; on Kyso, 2.5c below, regardless of quantity purchased, per month.

**Taxes*: In the tax column is included these city and county gasoline taxes at the following points: Mobile, 2c city; Birmingham, 1c city; Montgomery 1c city and 1c county; Pensacola, 1c city. Georgia and Montgomery, Ala. have kerosine taxes of 1c per gal., and Mississippi 0.5c, not included in above prices.

Above prices include these inspection fees on both gasoline and kerosine, per gallon, figured on basis of 50 gallons per barrel:
Alabama, 1/40c on gasoline, 1/2c on kerosine; Arkansas, 1/5c per gal. in a single barrel, 1/20c per gal. in bulk; Florida, 1/8c; Illinois, 3/100c; Indiana, 1/5c per gal. in lots up to 25 bbls.; 2/25c per gal. in lots of 25 bbls. or more; Kansas, 1/50c, (3/50c can be charged to meet inspection department expenses); Louisiana, 1/32c; Minnesota, 1/25c; Missouri, 3/100c; Nebraska, 3/100c; Nevada, gasoline, 1/20c; North Carolina, 1/4c; North Dakota, 1/20c; Oklahoma, 2/25c per gal. lots of more than 50 in bbls., 1/5c in lots less than 50 bbls.; South Carolina, 1/8c; South Dakota, 1/10c; Tennessee, 2/5c; and Wisconsin, 3/100c on gasoline, 1/25c on kerosine.
Kerosine inspection fee only: Iowa, 3/50c; Michigan, 1/5c per gal.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Aug. 22, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. Indiana

Red Crown (*Regular Grade*)
Stanolind (*Third Grade*)

	Red Crown Cons. T.W.	Dealer Prices Red Crown T.W.	Stanolind T.W.	Gasoline Taxes	Kerosine T.W.
Chicago, Ill.	11.6	9.6	6.4	4	10.5
Decatur, Ill.	11.6	10.1	8	4	10.5
Joliet, Ill.	11.6	10.1	8.4	4	10.5
Peoria, Ill.	11.6	10.1	9.6	4	10.5
Quincy, Ill.	11.4	9.9	8.8	4	10.3
Indianapolis, Ind.	12.3	10.8	8.9	5	*11.2
Evansville, Ind.	12.1	10.6	9.1	5	*11
South Bend, Ind.	12.6	11.1	9.2	5	*9
Detroit, Mich.	10.3	8.8	7.5	4	9
Grand Rapids, Mich.	10.8	9.8	9	4	9.7
Saginaw, Mich.	12.3	10.8	9.3	4	9.3
Green Bay, Wis.	12.4	10.9	10.2	5	10.3
Milwaukee, Wis.	11.8	10.3	9.5	5	10.7
La Crosse, Wis.	12	10.5	10	5	10.9
Minneapolis-St. Paul	12	10.5	10	5	10.9
Duluth, Minn.	12.4	10.9	10.4	5	11.3
Mankato, Minn.	12	10.5	10	5	10.9
Des Moines, Ia.	11.4	9.9	7.5	4	*10.3
Davenport, Ia.	11.6	10.1	9.6	4	*10.5
Mason City, Ia.	11.8	10.3	9.8	4	*10.7
St. Louis, Mo.	11.2	9.7	7.5	*4	10.1
Kansas City, Mo.	10.9	9.4	6.9	*4	8.5
St. Joseph, Mo.	10.9	9.4	8.9	*4	9.8
Fargo, N. D.	13.2	11.7	11.2	4	12.1
Minot, N. D.	14.5	13	12.5	4	13.4
Huron, S. D.	12.5	11	10.5	5	11.4
Wichita, Kans.	10.4	6.6	5.5	4	7.8

*Taxes: in the tax column is included these city and state gasoline taxes at following points: Kansas City, St. Joseph and St. Louis, 1c city tax. Kerosine taxes: Indiana has 4c, Iowa 3c per gal. state tax, not included in above prices.

Discount to commercial consumers: Effective Jan. 1, 1935, thru territory, except Michigan effective Feb. 1, on purchases per month, discount off t.w. prices; all gasolines, 25 to 1,000 gals., at t.w. price; 1,000 gals., or more, 1.5c off t.w. on Ethyl and Red Crown, and 1c on Stanolind (latter effective June 9, 1937). Minimum delivery is 25 gals.

S. O. Nebraska

Standard Red Crown Gasoline
(*Regular Grade*)

	T.W.	Dealer	Gasoline Taxes	Kerosine T.W.
Omaha, Neb.	12	10.5	6	10.8
McCook	11.5	10.5	6	10
Norfolk	12.4	8.9	6	11.2
North Platte	12.4	9.4	6	11
Scottsbluff	13.5	8.4	6	12.3

Discounts to commercial consumers: for tank wagon deliveries covered only by Standard Commercial Consumer Contract, effective January 1, 1935.

S. O. Louisiana

Essolene
(*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Little Rock, Ark.	7.75	10.25	7.5	11
Alexandria, La.	7.25	9.75	8	*11.5
Baton Rouge, La.	7.25	9.75	8	*11.5
New Orleans, La.	7.25	9.75	*10	*11.5
Lake Charles, La.	7.25	9.75	8	*11.5
Shreveport, La.	6	8.5	8	*10
Lafayette, La.	7.5	10	8	*11.5
Bristol, Tenn.	10.75	13.25	8	15
Chattanooga, Tenn.	10	12.5	8	14
Knoxville, Tenn.	10.5	13	8	14.5
Memphis, Tenn.	8.5	11	8	12.5
Nashville, Tenn.	9.5	12	8	13.5

*New Orleans gasoline tax includes 7c state, 1c federal, and 2c parish tax. Louisiana has kerosine tax of 1c per gal.; in addition New Orleans has 1c parish tax, none of which are included in above prices.

Price basis to dealers: Undivided dealers get dealer price, less 0.5c.

Price basis to commercial consumers: Effective May 15, 1937, thru territory; commercial consumers taking 50 gals. or more at one time will be billed at posted consumer t.w. price; those taking less than 50 gals. at one time will be billed at 4c per gal. over posted consumer t.w. price. Generally, the posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Humble Oil & Refining Co.

Humble Motor Fuel
(*Regular Grade*)

	*T.W.	S.S.	Gasoline Taxes	Kerosine T.W.
Dallas, Tex.	9	13	5	8
Ft. Worth, Tex.	9	13	5	8
Houston, Tex.	9.5	13.5	5	8
San Antonio, Tex.	9	13	5	8

U. S. Motor Gasoline
(*Third Grade*)

	*T.W.	S.S.	Gasoline Taxes
Dallas, Tex.	6	10	5
Ft. Worth, Tex.	6	10	5
Houston, Tex.	7	11.5	5
San Antonio, Tex.	7.5	10.5	5

*Price is t.w. price to all classes of dealers and consumers.

Continental Oil

Conoco Bronze (*Regular Grade*)
Demand (*Third Grade*)

	Dealer Prices Conoco Bronz-z-z	Demand	Gasoline Taxes	Kerosine T.W.
Denver, Colo.	10.5	9.5	5	11.5
Grand Junc., Colo.	14	13	5	15
Pueblo, Colo.	11.5	10.5	5	10.5
Casper, Wyo.	12	11	5	11.5
Cheyenne, Wyo.	8	7	5	13
Billings, Mont.	13.5	12.5	6	13
Butte, Mont.	13.5	10.5	6	15.5
Great Falls, Mont.	13	12	6	15.5
Helena, Mont.	14	13	6	15.5
Salt Lake City, Utah.	12	10	5	16
Boise, Ida.	15.5	12.5	6	18
Twin Falls, Ida.	15	14	6	18
Albuquerque, N. M.	11	10	†6.5	12
Roswell, N. M.	11	8.5	†6.5	10.5
Santa Fe, N. M.	12	9.5	*7	12
Muskogee, Okla.	9.5	7	5	7
Oklahoma City, Okla.	8.5	6.5	5	7
Tulsa, Okla.	7	5	5	7
Ft. Smith, Ark.	9.75	6.75	5	7.5
Little Rock, Ark.	9.75	8.125	7.5	8
Texarkana, Ark.	9	7	5	8

†Includes city tax of 0.5c.
*Includes 1c city tax.

S. O. California

Standard Gasoline
(*Regular Grade*)

	T.W.	S.S.	Gasoline Taxes	Kerosine T.W.
San Francisco, Cal.	13.5	14.5	4	11.5
Los Angeles, Cal.	13	14	4	10
Fresno, Cal.	14.5	15.5	4	12.5
Phoenix, Ariz.	15.5	16.5	6	*12.5
Reno, Nev.	15.5	16.5	5	13.5
Portland, Ore.	14	15	6	13.5
Seattle, Wash.	14	15	6	13.5
Spokane, Wash.	17	18	6	16.5
Tacoma, Wash.	14	15	6	13.5

Flight Gasoline
(*Third Grade*)

San Francisco, Cal.	12	13	4	....
Los Angeles, Cal.	11.5	12.5	4	....
Fresno, Cal.	13	14	4	....
Reno, Nev.	14	15	5	....
Phoenix, Ariz.	14	15	6	....
Portland, Ore.	12.5	13.5	6	....
Seattle, Wash.	12.5	13.5	6	....
Spokane, Wash.	15.5	16.5	6	....
Tacoma, Wash.	12.5	13.5	6	....

*Arizona has kerosine tax of 5c per gal., not included in above prices.

Discount to dealers: on gasoline, off t.w. price on Standard Ethyl and Standard Gasoline, to 100% dealers, 3c; to split dealers, 2c; on Flight gasoline, both 100% and split dealers, 2c.

On Stanavo Aviation Gasoline, to all classes of dealers, 3c off t.w.

To commercial consumers: off tank wagon price: on single deliveries of 40 gallons and over. Stanavo Aviation, Standard Ethyl and Standard Gasolines, 3c. Flight Gasoline, 2c per gallon. Tank wagon delivery, less than 40 gals., 1c per gal. above posted t.w. price. Discounts on kerosine: in tank cars, 3c off tank truck price; plant deliveries to jobbers, 2.5c below tank truck price.

Canada

PRICES OF IMPERIAL OIL LTD.
Per Imperial Gallon, which is 1.2 U. S. Gallons

3-Star Imperial Gasoline
(*Regular Grade*)

	T.W.	Gasoline Taxes	Kerosine T.W.
Hamilton, Ont.	16	6	17
Toronto, Ont.	16	6	17
Brandon, Man.	21.1	7	22.3
Winnipeg, Man.	20.5	7	20.7
Regina, Sask.	19	7	22
Saskatoon, Sask.	21.3	7	24.8
Edmonton, Alta.	19.5	7	21.5
Calgary, Alta.	16.5	7	19
Vancouver, B. C.	16	7	23
Montreal, Que.	15	6	17.5
St. John, N. B.	14.5	10	18.5
Halifax, N. S.	14.5	10	18.5

Discounts to undivided dealers, 1c off t.w. price, except Maritime Provinces where undivided dealers pay t.w. price. Divided dealers pay t.w. price, thru territory.

Aviation Gasoline

Following are tank car, tank wagon or dealer prices, as indicated, of aviation gasoline in several marketing territories.

S. O. OHIO
Thru Ohio
Stanavo Ethyl Aviation

	Consumer T.W.	Gasoline Taxes
73 octane	15.5	5
80 octane	16.5	5
87 octane	17.5	5

Discounts: For delivery on contract to hangar operators and resellers: 2c below consumer posted t.w. price, shown above.

S. O. INDIANA
Stanavo Ethyl Aviation Gasoline
73 Octane Number

Chicago, Ill.	14.9	4
Detroit, Mich.	16.5	4
Milwaukee, Wis.	15.1	5
Minneapolis, Minn.	15.3	5
St. Louis, Mo.	14.5	3
Kansas City, Mo.	14.2	*4
Fargo, N. D.	16.5	4
Huron, S. D.	15.8	5

*Includes 1c city tax.

HUMBLE OIL & REFINING CO.
Aviation Gasoline

	Tank Car
Baytown, Tex.	8.5

CONTINENTAL OIL CO.
Conoco Special Gasoline

	Dealer	Gasoline Taxes
Denver, Colo.	14.5	5
Cheyenne, Wyo.	15	5
Helena, Mont.	17	6
Salt Lake City, Utah.	17.5	5
Albuquerque, N. M.	14	*6.5

*Includes city tax of 0.5c.

S. O. CALIFORNIA
Stanavo Aviation Gasoline

	T.W.	
Phoenix, Ariz.	17.5	6
Los Angeles, Cal.	15	4
San Francisco, Cal.	15.5	4
Reno, Nev.	17.5	5
Portland, Ore.	16	6
Seattle, Wash.	16	6
Spokane, Wash.	19	6

Note: For discounts, etc., see note under Standard and Flight gasoline above.

Naphtha (In Tank Wagon)

S. O. NEW JERSEY

	Posted Tank Wagon Prices Mineral Spirits	V.M.&P.
Newark, N. J.	11.5	15.5
Baltimore, Md.	15.5	....
Washington, D. C.	15	....

Discounts: Buyers taking following quantities, at one time, get these discounts: Newark, 2c per gal. on 200 gals. or more; less than 200 gals., 0.5c higher price. Baltimore 2c off on 25 to 100 gals. and 3c on over 100 gals. Washington, 2c off to contract buyers.

SOCONY-VACUUM OIL CO.

Buffalo, N. Y.	11	12.5
*New York City	9.5	10.5
Rochester, N. Y.	12	12.5
Syracuse, N. Y.	12.5	15
Boston, Mass.	11.5	11.5
Bridgeport, Conn.	11	11.5
Hartford, Conn.	11	11.5
Providence, R. I.	11.5	12.5

*Prices apply to consumers only in quantities over 1,000 gals. annually. For quantities under 1,000 gals. annually, add 0.5c per gal.

ATLANTIC REFINING CO.

Philadelphia, Pa.	11.5	12.5
Lancaster, Pa.	13	14
Pittsburgh, Pa.	12.5	14.5

Note: Prices for Mineral Spirits also apply to Stoddard Solvent; and prices for V.M.&P. Naphtha apply also to Light Cleaners Naphtha.

S. O. OHIO

	S.R. Solvent	V.M.&P. Naphtha
Thru Ohio	12.5	13.5

Note: V.M.&P. Naphtha prices also apply on Dry Cleaners naphtha and special Varnolene; Varnolene and Sohio Solvent 0.5c below these prices. Discounts to contract consumers, off t.w. price: 300 to 999 gals., 0.5c; 1,000 to 2,499 gals., 0.75c; 2,500 to 4,999 gals., 1c; 5,000 or more gals., 1.5c.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Aug. 22, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.

S. O. INDIANA

(Prices include state and federal taxes)

	Oleum Spirits	V.M.&P. Naphtha	Stanisol
Chicago, Ill.	16.2	16.5	15.9
Detroit, Mich.	19.2	18.7	19.7
Kansas City, Mo.	13.9	14.9	14.4
St. Louis, Mo.	14.2	15.2	12.9
Milwaukee, Wis.	18.8	19.8	19.3
Minneapolis, Minn.	19	20	17.7

Note: All prices, with exception of Missouri points, include state tax. Prices shown are base prices, before discounts.

Naphtha (In Tank Cars)

In Tank Cars (F. o. b. refinery or seaboard terminal except Ohio, delivered price.)

	V.M.&P. Naphtha	Solvent
Baltimore	10.5	9.5
New York Harbor	10	9
Philadelphia district	10.5	9
Boston	10.5	9.5
Providence	10.5	9.5
Ohio points, delivered	8.875	*8

*This is on rubber solvent.

Note: In Ohio, prices on D.C. naphtha and special Varnolene are same as V.M.&P.; on Varnolene and Sohio Solvent, prices are 0.5c less than on V.M.&P

Latest Changes

From Aug. 16 to Aug. 22 inclusive. Dates and amounts of changes shown. See table for full current prices.

Socony-Vacuum—Socony Mobilgas:

Binghamton dealer t. w. cut 0.6c, Aug. 19.

Humble Oil & Refining—U. S. Motor:

Houston t.w. cut 1.5c, Aug. 17.

S. O. Indiana—Stanolind:

Saginaw dealer price up 0.5c, Aug. 12.

Continental Oil—Conoco Bronz-z-z:

Salt Lake city dealer price cut 1c, Aug. 19.

Corrections

Notation of amount of change and dates not previously shown in table. Table in this issue is corrected to show these changes.

S. O. Indiana—Inspection fee:

On gasoline, cut 0.5c per bbl., to 1.5c per 50-gal. bbl., Aug. 1.

S. O. Nebraska—Red Crown:

Norfolk dealer cut 2c, Aug. 11.

S. O. Louisiana—Kerosine:

Advance reported on page 44 of Aug. 17 issue was effective Aug. 16 in Arkansas, and Aug. 17 in Louisiana and Tennessee, instead of Aug. 15 in all states, as at first reported by S. O. Louisiana.

Continental Oil—Demand gasoline:

Boise dealer price cut 2c, July 23.

Naphtha

Socony-Vacuum—Mineral Spirits and V. M. & P.:

Bridgeport cut 0.5c, July 21.

Big Gains in Tanker Shipments From Gulf Ports During 1937

CLEVELAND, Aug. 23. — An increase of 22.8 per cent in domestic coastwise shipments of crude petroleum and gasoline from Texas gulf ports in 1937 over the previous year is shown by comparison of statistics just issued by the U. S. Bureau of Commerce, Houston office, with War Department statistics for 1936. Exports were up more than 50 per cent.

The increase in crude oil shipments coastwise, approximately 5,500,000 short tons, or nearly 37,000,000 barrels, brought the total shipments in 1937 to 24,196,885 tons, which is close to 133,000,000 barrels. Gasoline, next in volume of shipments, gained 20,540,000 barrels to make a total of 110,800,000 barrels.

Petroleum products led all other commodities in tonnage and value of coastwise shipments from Texas ports by a wide margin. The value of all domestic petroleum shipments coastwise was three times that of all other products put together. At Beaumont, for example, the value of all petroleum shipments coastwise was $159,000,000 out of a total for all products of $169,000,000. Total value of coastwise shipments of petroleum products from Texas gulf ports in 1937 was nearly $700,000,000.

Most notable proportionate gains in shipments, both coastwise and export, were at Corpus Christi and Texas City. Coastwise crude shipments from Corpus Christi went up 80 per cent to over 21,000,000 barrels. Texas City was outstanding in all products listed. Its gasoline shipments more than doubled in 1937 to reach the total of 14,780,000 barrels.

Houston, Port Arthur, and Beaumont, the leading ports for petroleum shipments, made small gains in domestic shipments for the most part.

Gas oil and fuel oil shipments coastwise, third in volume for the 10 ports, made the smallest proportional gain, nearly 7 per cent. Bunker oil shipments, fourth in volume, dropped slightly in volume of shipments.

Gains in exports from seven ports were more impressive than domestic shipments. These ranged from 42 per cent for gas oil and fuel oil to 59 per cent for gasoline. Largest volume gain was for crude oil, which jumped from 21,600,000 barrels to 33,700,000 barrels. Houston was the leading port for all petroleum products. Port Arthur was second high. Gasoline exports from Texas ports in 1937 were 17,300,000 barrels and bunker oil totaled 15,300,000 barrels.

TANK WAGON MARKETS, HEATING OILS

Prices in Effect Aug. 22, 1938

Following are posted tank wagon prices of various grades of heating oil at the points shown in various territories. Prices are in cents per gallon.

	No. 1	No. 2	No. 4
S. O. NEW JERSEY			
Atlantic City, N. J.	8.0	6.0	6.0
Newark	8.0	6.0	6.0
Annapolis, Md.	....	6.25	....
Baltimore	7.0	6.0	5.5
Washington, D. C.	7.25	6.5	6.5
Norfolk, Va.	7.0	6.0	6.0
Petersburg	7.25	6.25	....
Richmond	7.25	6.25	6.25
Charlotte, N. C.	8.75	7.75	....
Hickory	....	8.25	....
Raleigh	8.75	7.25	....
Charleston, S. C.	8.5	7.0	....
Columbia	9.8	8.3	....
Spartanburg	10.7	9.2	....

SOCONY-VACUUM OIL CO. INC.
(S. O. New York Division)

	No. 2	No. 3	No. 4
New York City	6.50	6.50	6.50
Albany, N. Y.	7.00	7.00	6.50
Rochester, N. Y.	7.50	7.50	7.50
Boston, Mass.	6.00	6.00	6.00
Bangor, Me.	7.50	7.50	7.50
Manchester, N. H.	6.50	6.50	6.50
Burlington, Vt.	8.00	8.00	8.00
Hartford, Conn.	6.00	6.00	6.00
New Haven, Conn.	5.25	5.25	5.25
Providence, R. I.	6.00	6.00	6.00

Note: Prices for No. 1 fuel in Socony-Vacuum territory same as for kerosine which see in tank wagon table for various cities; prices change with kerosine.

	No. 1	No. 2	No. 3	No. 4
ATLANTIC REFINING Cont'd				
Philadelphia, Pa.	7.75	7.00	7.00	7.00
Allentown, Pa.	8.25	7.50	7.50	7.50
Wilmington, Del.	8.25	7.50	7.50	7.50
Springfield, Mass.	9.00	7.50	....	7.50
Worcester, Mass.	9.00	7.50	....	7.50
Hartford, Conn.	9.00	7.50	....	7.50
S. O. OHIO				
Columbus Division and Cleveland	7.50	7.50	7.00	....
City of Lima	8.00	8.00	7.00	....
Rest of Ohio	8.00	8.00	7.50	....

Note: S. O. Ohio prices are for full compartment hose dumps, bucket dumps are 0.5c per gallon higher.

S. O. INDIANA
Stanolex Fuel and Furnace Oils

	No. 1 Fuel	Stanolex Furnace
Chicago	(a)6.5	6.5
Indianapolis	...	(b)7.8
Detroit	...	7.1
Milwaukee	8.4	7.7
Minneapolis	7.8	7.8
St. Louis	7.7	7.0
Kansas City	6.8	6.8

(a) For 400 gals. and over; 150 to 399 gals., 7c, 1 to 149 gals., 8c.
(b) Excluding 4c state tax.
Note: Small-lot deliveries of light fuel oils range up to 2c higher than above quotations.

SEABOARD MARKETS, EXPORT AND COASTWISE

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). In cargo markets, spot shipment is 90 days. Prices in cents per gallon, except heavy fuel oil in dollars per barrel, in tank car lots, f.o.b. refineries or seaboard terminals in districts designated, unless otherwise noted. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Eastern Domestic

(Inter-refinery and export prices not included.)

MOTOR GASOLINE

Prices Effective	Aug. 22	
District:	(a)60-64 Oct.	(a) 65 Oct. & Above
N. Y. harbor	6.50 – 6.75	6.50 – 7.00
(b)N. Y. harbor	6.25 – 6.50	6.25 – 6.75
Philadelphia	6.50	6.50 – 6.75
Baltimore	6.50	6.75
Norfolk	6.75 – 7.00	7.00 – 7.25
Wilmington, N. C.	6.75 – 7.00	7.00 – 7.25
Charleston, S. C.	6.75 – 7.00	7.00 – 7.25
Savannah	7.00 – 7.25	7.25 – 7.50
Jacksonville	7.00 – 7.25	7.25 – 7.50
Portland	7.00 – 7.50	7.25 – 7.75
Boston	6.25 – 7.00	6.50 – 7.00
Providence	6.25 – 7.00	6.50 – 7.00

WATER WHITE KEROSINE

District:			
N. Y. harbor	4.75	Charleston	5.00-5.25
(b)N. Y. harbor	4.625	Savannah	5.25-5.50
Philadelphia	5.00 -5.25	Jacksonville	5.25-5.50
Baltimore	5.00 -5.25	Portland	5.60
Norfolk	5.00 -5.25	Boston	5.00-5.25
Wilmington, N.C.	5.00 -5.25	Providence	5.00-5.25

(c)FUEL OILS

	N. Y. harb.	N. Y. harb. barges
No. 1	4.75	4.625
Nos. 2-3	4.25	4.125
No. 4	4.00 – 4.25	3.875– 4.125
No. 5	(s)$1.15	.....
No. 6	$0.95	.....

	Phila. dist.	Balt. dist.
No. 1	5.00 – 5.25	5.00 – 5.25
Nos. 2-3	4.25	4.25
No. 4	4.00	4.00 – 4.25
No. 5	$1.15	$1.15
No. 6	$0.95	$0.95

	Bost. dist.	Prov. dist.
No. 1	5.00 – 5.25	5.00 – 5.25
Nos. 2-3	4.25	4.25
No. 4	4.00 – 4.25	4.00 – 4.25
No. 5	$1.15	$1.15
No. 6	$0.95	$0.95

District:	(d)Bunker C Fuel	(d)Diesel Oil
N. Y. harbor	(f)$0.95	(g)$1.75
Philadelphia	(f)$0.95	(g)$1.75
Baltimore	(f)$0.95	(g)$1.55
Norfolk	(e)$0.95	$1.75
Charleston	$0.90	$1.75
Savannah	(e)$0.90	$1.785
Jacksonville	(e)$0.90	$1.785
Tampa	(e)$0.85	$1.785
Portland	$1.05	$1.85
Boston	(f)$0.95	(g)$1.75
Providence	$0.95	$1.75

	Gas Oil 28-34 Gravity	Diesel Oil Shore Plants
N. Y. harbor	4.00 – 4.25	4.00 – 4.25
Philadelphia dist.	4.25	....
Baltimore dist.	4.25	....
Norfolk dist	4.25	....
Savannah dist.	....	4.25
Jacksonville dist.	....	4.25

Pacific Export

(i) (Quotations are at seaboard, Los Angeles, in cargo lots, cents per gal., except where otherwise noted.)

Prices Effective	Aug. 22	Aug. 15
U. S. Motor, under 65 oct.	4.875– 5.00	4.875– 5.00
400 e.p. blend, under 65 oct.	5.00 – 5.25	5.00 – 5.25
400 e.p. blend 65 oct. & above	5.125– 5.375	5.25 – 5.375
(h) 38-40 w.w. kerosine	4.25 – 4.75	4.25 – 4.75
41-43 w.w. kerosine	4.75 – 5.00	4.75 – 5.00
44 w.w. kerosine	5.25 – 5.50	5.25 – 5.50
In Cargo lots, per bbl.		
Diesel fuel, 24° & above	$1.05 –$1.15	$1.00 –$1.10
Diesel fuel, under 24°	$0.95 –$1.05	$0.95 –$1.05
(h)30-34 diesel (gas oil)	$1.10 –$1.30	$1.10 –$1.36
(k) Grade C fuel oil	$0.55 –$0.70	$0.50 –$0.70

Prices Effective	Aug. 22	Aug. 15
In Ships' Bunkers, or deep tank lots, per bbl.:		
(j)Diesel fuel oil	$1.525–$1.55	$1.525–$1.55
(k)Grade C fuel oil	$0.70 –$0.90	$0.70 –$0.90
Cased Goods: (Per case)		
U. S. Motor	$1.40 –$1.525	$1.40 –$1.525
400 e.p. blend, under 65 octane	$1.50 –$1.60	$1.50 –$1.60
400 e.p. blend, 65 oct. & above	$1.60 –$1.70	$1.60 –$1.70
(h)40-43 w.w. kerosine	$1.30 –$1.40	$1.30 –$1.40
Kerosine, p.w.	$1.25 –$1.35	$1.25 –$1.35

New York Export

(Cents per gal. in bbls. F.a.s. New York)

CYLINDER OILS (Pennsylvania Products)

Bright stock:		
Light, 25 p.t.	21.00 –21.50	20.50 –21.50
Neutral oil:		
200 3 color, 25 p.t.	21.50 –22.50	21.50
150 3 color, 25 p.t.	20.50 –21.50	20.00 –20.50
600 s.r., unfiltered	15.50 –16.50	15.50 –16.50
650 s.r., unfiltered	17.50 –18.50	17.50 –18.50
600 fl., s.r.	18.00 –19.00	18.00 –19.00
630 fl., s.r.	20.50 –21.50	20.50 –21.50

Wax, Domestic *and* Export

(A.S.T.M. Tests. Melting points, however, are A.M.P., 3° higher than E.M.P. Export prices, f.a.s., carloads. Domestic prices, f.o.b. refineries in New Orleans & New York districts in bags, carloads, with 0.2c discount allowed for shipment in bulk, except where noted below. Scale solid; fully refined, slabs in bags)

Prices Effective	Aug. 22	
	New York	
	Domestic	Export
124-6 Y.C. scale	2.25 – 2.35	2.25 – 2.35
122-4 W.C. scale	2.25 – 2.35	2.25 – 2.35
124-6 W.C. scale	2.25 – 2.35	2.25 – 2.35
123-5 Fully rfd.	3.75	3.375– 3.50
125-7 Fully rfd.	3.90	3.50 – 3.625
128-30 Fully rfd.	(l)4.00	3.65 – 3.875
130-2 Fully rfd.	(l)4.35	4.00 – 4.125
133-5 Fully rfd.	(l)4.65	4.40 – 4.625
135-7 Fully rfd.	(l)4.90	5.00 – 5.125
	New Orleans	
	Domestic	Export
124-6 Y.C. scale	2.25 – 2.35	2.25 – 2.35
122-4 W.C. scale	2.25 – 2.35	2.25 – 2.35
124-6 W.C. scale	2.25 – 2.35	2.25 – 2.35
123-5 Fully rfd.	3.75	3.375– 3.50
125-7 Fully rfd.	3.90	3.50 – 3.625
128-30 Fully rfd.	(l)4.00	3.65 – 3.875
130-2 Fully rfd.	(l)4.35	4.00 – 4.125
133-5 Fully rfd.	(l)4.65	4.40 – 4.625

Gulf Coast

(F.o.b. ship, Gulf oil terminals; minimum 20,000 bbls.; representing traders' opinions)

Prices Effective	Aug. 22	Aug. 15
For Domestic shipment:		
MOTOR GASOLINE		
59 oct. & below	4.625– 4.875	4.75 – 5.00
60-64 oct.	4.75 – 5.25	5.00 – 5.25
65-67 octane	5.00 – 5.375	5.125– 5.375
68-70 octane	5.375– 5.50	5.50 – 5.75
FUEL OILS		
No. 1	3.875– 4.00	3.875– 4.00
No. 2	3.50	3.50
KEROSINE		
41-43 w.w.	4.00	4.00
For Export Shipment:		
GASOLINE		
U. S. Motor	4.625– 4.75	4.75 – 5.00
60-62, 400 e.p.	4.625– 4.75	4.75 – 5.00
61-63, 390 e.p.	4.625– 5.00	4.75 – 5.00
64-66, 375 e.p.	4.625– 5.00	4.875– 5.00
KEROSINE		
44 w.w.	(a) 4.25 –4.50	(a) 4.25 –4.50
41-43 w.w.	4.00	4.00
41-43 p.w.	4.00	4.00

Prices Effective	Aug. 22	Aug. 15
GAS AND BUNKER OILS		
For Export Shipment		
Gas Oil (m):		
Below 43 diesel index	3.50	3.50
43-47 diesel index	3.50 – 3.625	3.50 – 3.625
48-52 diesel index	(a) 3.50 –3.625	(a) 3.50 –3.625
53-57 diesel index	3.625– 3.75	(a) 3.625–3.75
For Domestic and /or Export Shipment		
Diesel Oil Ship's bkrs.	(o)$1.55	(o)$1.55
Grade C bunker oil for ship's bunkers	(o)$0.75	(o)$0.75
Grade C bunker oil, in cargoes	$0.60 –$0.65	$0.625–$0.65

MID-CONTINENT LUBRICATING OILS

(Cents per gal. at Gulf; in bbls., f.a.s.; in bulk, f.o.b. terminals)

	Aug. 22	
190-200 vis. D. 210 brt. stock	(p)Barrels 22.50 –24.50	Bulk 17.60 –17.75
150-160 vis. D 210 brt. stock:		
0-10 p.p.	19.00 –20.50	13.00 –14.75
10-25 p.p.	18.50 –20.00	12.50 –14.25
150-160 vis. E 210 brt. stock	18.50 –20.00	13.00 –14.50
120 vis. D 210 brt. stock	18.50 –20.00	13.00 –14.50

	Aug. 22	Aug. 15
180 vis. No. 3 color neutral:	Bulk	Bulk
0-10 p.p.	10.00 –10.50	10.00 –10.50
15-30 p.p.	9.50 –10.00	9.50 –10.00
200 vis. No. 3 color neutral:		
0-10 p.p.	10.00 –10.50	10.00 –10.50
15-30 p.p.	9.50 –10.00	9.50 –10.00
600 s.r. olive green	9.00 –11.25	9.00 –11.25
600 s.r. dark green	7.00 – 9.25	7.00 – 9.25

SOUTH TEXAS LUBRICATING OILS

(Vis. at 100° cold test 0, bulk export shipment, f.o.b. terminals.)

Vis. Color		
Unfiltered Pale Oils:		
100 No. 3	4.75 – 5.00	4.75 – 5.00
200 No. 3	6.25 – 6.75	6.25 – 6.75
300 No. 3	6.75 – 7.25	6.75 – 7.25
500 No. 3½	7.75 – 8.25	7.75 – 8.25
750 No. 4	8.25 – 8.75	8.25 – 8.75
1200 No. 4	8.75 – 9.25	8.75 – 9.25
2000 No. 4	9.00 – 9.50	9.00 – 9.50
Red Oils:		
100 No. 5-6	4.75 – 5.00	4.75 – 5.00
200 No. 5-6	6.25 – 6.75	6.25 – 6.75
300 No. 5-6	6.75 – 7.25	6.75 – 7.25
500 No. 5-6	7.75 – 8.25	7.75 – 8.25
750 No. 5-6	8.25 – 8.75	8.25 – 8.75
1200 No. 5-6	8.75 – 9.25	8.75 – 9.25
2000 No. 5-6	9.00 – 9.50	9.00 – 9.50

Note: Red oil prices cover oils with green cast; prices for blue cast red oils are slightly lower in some cases.

Tanker Rates

(Approximate freight rates to Continental ports, shillings per ton of 2240 lbs., British sterling; U. S. ports cents per bbl.)

Rates Effective Aug. 22

	Crude &/or Fuel		Refined Oil &/or Spirits	
	Last Paid	Owners Ask	Last Paid	Owners Ask
Gulf-U.K./Cont.(q)	11/6	12/-12/6	12/	12/6-13/
Aruba-U.K./Cont.(q)	10/	10/-10/6	10/	10/6-11/
Gulf-N. Atlantic (r) (not E. of N.Y.):				
Hvy. Crude & fuel, (10 to 19.9 gravity)	18c	19c	....	....
Light Crude, (30 Grav. or Lighter)	15c	15-16c	....	....
Gasoline	....	....	15c	16-17c
Kerosine	....	....	15c	16-17c
Light Fuel	....	....	16c	16-17c

(a) Prices nominal. (b) In barge lots. (c) Fuel oils meet specifications of U. S. Commercial Standards CS12-35. (d) In ships' bunkers. (e) For barging, add 5c per bbl. (f) For barging, add 5c to 6c per bbl. (g) For barging, add 6.5c to 7.5c per bbl. (h) 150 fire point. (i) For San Francisco cargo prices, add 5c per bbl. to cargo prices shown above. (j) Pacific Specification 200. (k) Pacific Specification 400. (l) Shipment either in bags or in bulk. (m) Less than ½ of 1% sulfur. (n) No prices reported. (o) Barging 5c per bbl. additional at some Gulf ports. (p) Second-hand barrels. (q) Continental ports in range between Bordeaux and Hamburg, both inclusive. (r) Venezuela loading, same rate; Tampico, 2c to 3c per bbl. additional. (s) Low pour test, low viscosity, No. 5 generally quoted at $1.25.

CRUDE OIL MARKETS

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I. gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN FIELDS

Posted by Joseph Seep Purchasing Agency

(Effective June 13, 1938, except Corning June 16, 1938)

Penna. Grade Oil in Southwest Penna. Pipe Lines.....$1.46
Penna. Grade Oil in Eureka Pipe Lines (West Virginia).....$1.40
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O.).....$1.30
Corning Oil in Buckeye Pipe Lines (Ohio)...$1.17

Posted by Other Companies

Tide Water Associated Oil Co. Bradford-Allegany district (Penna. and N. Y.) (Effective June 13, 1938).....$1.80
The Pennzoil Co.: (Effective June 13, 1938) Penna. Grade Oil in National Transit Lines$1.73
Ashland Oil & Transportation Co.: Somerset Oil in Ashland Lines (Ky.):

(Effective July 1, 1938)

Big Sandy River.....$1.32
Kentucky River.....$1.40

*The Pennzoil Co. posts $1.73 in Cochran, Franklin, Hamilton and Doolittle, Pa. fields; prices in other lower districts range down to $1.68 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co.

Midland, Midland County (Jan. 5, 1938)....$1.12

Posted by Simrall Corp.

(Effective Aug. 9, 1938)

West Branch, Arenac, and equal grades.....$0.90

(Effective Jan. 8, 1938)

Allegan, Crystal, Greendale, Porter and equal grades.....$1.12
Beaverton, Buckeye, Bentley, Edenville and Freeman.....$1.095

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

(Effective Jan. 28, 1937)

Illinois, Princeton.....$1.35

(Effective June 22, 1938)

Owensboro, (Western Ky.).....$1.30

(Effective Nov. 20, 1937)

Lima, O.....$1.00

Posted by Owensboro Corp.

(Effective May 25, 1938)

North Centralia, Ill.....$1.25

(Effective Aug. 8, 1938)

Centralia, Ill. (congested area).....$1.10

Posted by Stoll Oil Refining Co.

(Effective June 22, 1938)

Stoll Pipe Line Oil (Ky.).....$1.30

CANADIAN FIELDS

Posted by Imperial Oil Limited

Western Ontario

(Effective Sept. 9, 1933)

Petrolia.....$2.10
Oil Springs.....$2.17

Alberta—Turner Valley

(Prices f.o.b. field tankage)

(Effective Jan. 5, 1938)

Crude Oil

40-40.9°	$1.14	53-53.9	$1.40
41-41.9	1.16	54-54.9	1.42
42-42.9	1.18	55-55.9	1.44
43-43.9	1.20	56-56.9	1.46
44-44.9	1.22	57-57.9	1.48
45-45.9	1.24	58-58.9	1.50
46-46.9	1.26	59-59.9	1.52
47-47.9	1.28	60-60.9	1.54
48-48.9	1.30	61-61.9	1.56
49-49.9	1.32	62-62.9	1.58
50-50.9	1.34	63-63.9	1.60
51-51.9	1.36	64-64.9	1.62
52-52.9	1.38		

Crude Naphtha, 65 grav. & above.....$2.14

Absorption Gasoline

90% Rec., 20 lb. Reid v.p.....$1.94
90% Rec., 17 lb. Reid v.p.....$2.08

†MID-CONTINENT

(Effective Jan. 28, 1937)

	(In Oklahoma-*Kansas)	(In North-North Central Texas)
Below 29	$1.06	$0.96
29-29.9	1.08	0.98
30-30.9	1.10	1.00
31-31.9	1.12	1.02
32-32.9	1.14	1.04
33-33.9	1.16	1.06
34-34.9	1.18	1.08
35-35.9	1.20	1.10
36-36.9	1.22	1.12
37-37.9	1.24	1.14
38-38.9	1.26	1.16
39-39.9	1.28	1.18
40 & above	1.30	1.20

†Prices shown in table posted by Standard Oil Co. (Indiana) in Okla.-Kans., and Stanolind Oil Purchasing Co. in Texas.

Above Stanolind prices met as follows:

Jan. 28, Continental Oil Co. met in Okla., Kans., and North Texas. Sinclair-Prairie met in North Texas and North Central Texas, Jan. 28, Stanolind's North Texas schedule. Same date, The Texas Co. met in North-North Central Texas.

Effective June 16, 1938, Kanotex Refg. Co. posted Okla.-Kans. crude, 34 & below, at $1.03, 35-35.9 at $1.05, plus 2c differential to 40 & above, at $1.15.

Note: Stanolind prices in Okla.-Kans. are for quantities computed by 97% tank tables. In Texas, 100% tank tables are used effective Oct. 1, 1937, volume corrected to 60° F., and deduction for full b.s. & w. content.

*Effective Aug. 1, 1937, for Otis-Albert pools Rush-Barton counties, Kans., 13c less.

Posted by Carter Oil Co.

In Oklahoma

(Effective Jan. 28, 1937)

Below 25	$0.98	33-33.9	$1.16
25-25.9	1.00	34-34.9	1.18
26-26.9	1.02	35-35.9	1.20
27-27.9	1.04	36-36.9	1.22
28-28.9	1.06	37-37.9	1.24
29-29.9	1.08	38-38.9	1.26
30-30.9	1.10	39-39.9	1.28
31-31.9	1.12	40 and above	1.30
32-32.9	1.14		

Above Carter schedule met Jan. 28 by the following companies: Sinclair-Prairie, Shell and Barnsdall in Oklahoma-Kansas; Skelly Oil in Kansas; Tide Water in Oklahoma; Pure Oil in Oklahoma-Kansas, beginning with below 24 at $0.98 and ending with 40 & above at $1.30.

Posted by Magnolia Petroleum Co.

(Effective Jan. 28, 1937)

In Oklahoma, same schedule as Carter Oil, which see above, beginning with below 25, at $0.98 and ending with 40 & above, at $1.30.

In Texas: North and North Central, including Burkburnett, Archer, Henrietta, Electra, Comanche and Olden, same gravity and price schedule as Stanolind in North Texas, which see under Stanolind, beginning with below 29 at $0.96 and ending with 40 and above, at $1.20.

Jefferson County, Texas

	Beaumont (Magnolia) (Oct. 1, 1937)	West Beaumont (Humble) (May 1, 1938)
Below 21°.	$0.95	$0.95
21-21.9	0.98	0.98
22-22.9	1.01	1.01
23-23.9	1.04	1.04
24-24.9	1.07	1.07
25-25.9	1.10	1.10
26-26.9	1.13	1.13
27-27.9	1.15	1.15
28-28.9	1.17	1.17
29-29.9	1.19	1.19
30-30.9	1.21	1.21
31-31.9	1.23	1.23
32-32.9	1.25	1.25
33-33.9	1.27	1.27
34-34.9	1.29	1.29
35-35.9	for	1.31
36-36.9	oil	1.33
37-37.9	34 & above	1.35
38-38.9		1.37
39-39.9		1.39
40 & above		1.41

TEXAS FIELDS

Posted by Humble Oil & Refining Co.

(*West Central Texas)

(Effective Jan. 28, 1937)

Below 29	$0.96	35-35.9	$1.10
29-29.9	0.98	36-36.9	1.12
30-30.9	1.00	37-37.9	1.14
31-31.9	1.02	38-38.9	1.16
32-32.9	1.04	39-39.9	1.18
33-33.9	1.06	40 and above	1.20
34-34.9	1.08		

*Includes Brown, Callahan, Coleman, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, Throckmorton and Young counties.

Shell Petroleum Corp., effective Jan. 28, posts Humble's above schedule on Fisher county crude, plus these five lower grades, beginning with below 25 gravity at $0.88; 25-25.9, $0.90; 26-26.9, $0.92; 27-27.9, $0.94, and 28-28.9, $0.96; rest of schedule same as Humble's in West Central Texas.

Note: Effective Oct. 1, 1937, Humble prices are based on 100% tank tables at 60F.

****East Central Texas***

(Effective Jan. 28, 1937)

Below 29	$1.03	35-35.9	$1.17
29-29.9	1.05	36-36.9	1.19
30-30.9	1.07	37-37.9	1.21
31-31.9	1.09	38-38.9	1.23
32-32.9	1.11	39-39.9	1.25
33-33.9	1.13	40 and above	1.27
34-34.9	1.15		

*Including Anderson, Cherokee, Limestone, Navarro counties.

Same date, Sinclair-Prairie met in Mexia Humble's above schedule.

PANHANDLE TEXAS

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

	Gray County	Carson-Hutchinson
Below 35	$0.96	$0.91
35-35.9	0.98	0.93
36-36.9	1.00	0.95
37-37.9	1.02	0.97
38-38.9	1.04	0.99
39-39.9	1.06	1.01
40 & above	1.08	1.03

Jan. 28, above prices met by Sinclair-Prairie and Magnolia in the entire area and by Continental in Carson-Hutchinson and by Texas Co. in Panhandle Sweet, same as Humble's Gray Co. and on Panhandle Sour, same as Carson-Hutchinson.

EAST TEXAS

(Effective May 22, 1937)

Stanolind, Humble, Shell, Sinclair-Prairie, Texas Co., and Magnolia.....$1.35

Shell also posted on Jan. 28, in Livingston area, Polk County, Texas, $1.27.

NORTHEAST TEXAS

(Posted by Humble, Jan. 28, 1937)

Talco.....$0.73

(Posted by Magnolia, Jan. 28, 1937)

Cass County and Panola County, Tex.:

Same gravity and price schedule as S. O. Louisiana posts for Rodessa, La., which see under that company

(Posted by The Texas Co., Jan. 28, 1937)

Cass County.....$1.25

WEST TEXAS AND NEW MEXICO

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

(Including Andrews, Crane, Crockett, Ector, Glasscock, Howard, Winkler and Upton Counties, Texas and Lea county, New Mexico).

Below 26	$0.78	33-33.9	$0.94
26-26.9	0.80	34-34.9	0.96
27-27.9	0.82	35-35.9	0.98
28-28.9	0.84	36-36.9	1.00
29-29.9	0.86	37-37.9	1.02
30-30.9	0.88	38-38.9	1.04
31-31.9	0.90	39-39.9	1.06
32-32.9	0.92	40 & above	1.08

Pecos, West Texas.....$0.91

Jan. 28, Magnolia met Humble in Crane, Upton, Howard, Glasscock, Mitchell and Winkler.

Shell Petroleum Corp., on Jan. 28, met Humble in Crane, Glasscock, Howard, Pecos (except Yates shallow pool), Winkler, and Upton counties, Tex., and in Lea County, N. Mex. On Jan. 28, Shell posted in Yates shallow pool in Pecos county, Tex., $0.81. June 4, 1937, Shell added Ector county to West Texas postings.

Jan. 28, Stanolind Oil & Gas Co. met Humble in Hendrick field, Winkler county.

Jan. 28, Texas Co. met Humble in Ward and Winkler counties, Tex., and Lea County, N. M. except that its top grade is 36 and above, at $1.00.

April 20, 1937, Sinclair Prairie met Humble in Ward and Winkler, Tex. and Lea, N. M., counties, except that its gravity schedule ends with 36 and above, at $1.00.

Posted by Continental Oil Co.

(Effective Jan. 28, 1937)

Artesia, Jackson and Maljamar pools, N. M...$0.90

COLORADO

(Posted by Continental Oil Co.)

(Effective Jan. 28, 1937)

Ft. Collins and Wellington

Below 29	$1.01	35-35.9	$1.15
29-29.9	1.03	36-36.9	1.17
30-30.9	1.05	37-37.9	1.19
31-31.9	1.07	38-38.9	1.21
32-32.9	1.09	39-39.9	1.23
33-33.9	1.11	40 & above	1.25
34-34.9	1.13		

Canon City and Florence, Col.....$1.10

SOUTH AND SOUTHWEST TEXAS

All Shown Below Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

Carroll, Clark, Darst Creek, Hilbig, Salt Flat and Zoboroski fields.....$1.09
Pettus.....$1.37 Van Zandt.....$1.10

Jan. 28, Magnolia met Humble in Darst Creek; posted $1.00 in Luling; $1.12 in Lytton Springs; $1.27 for Cleveland, and $1.15 in Hardin, both in Liberty county, Tex. Effective July 11, 1938, Sun Oil Co. posted $1.15 for Hardin.

Jan. 28, 1937, The Texas Co. met Humble in Darst Creek.

Anahuac, Dickinson, Flour Bluff and Turtlebay

(Effective Jan. 28, 1937)

Below 31	$1.16	36-36.9	$1.28
31-31.9	1.18	37-37.9	1.30
32-32.9	1.20	38-38.9	1.32
33-33.9	1.22	39-39.9	1.34
34-34.9	1.24	40 and above	1.36
35-35.9	1.26		

Conroe, Raccoon Bend (Deep sand crude) Tomball and Satsuma

(Effective Jan. 28, 1937)

Below 29	$1.20	35-35.9	$1.34
29-29.9	1.22	36-36.9	1.36
30-30.9	1.24	37-37.9	1.38
31-31.9	1.26	38-38.9	1.40
32-32.9	1.28	39-39.9	1.42
33-33.9	1.30	40 & above	1.44
34-34.9	1.32		

Jan. 28, Magnolia met Humble in Tomball and Texas Co. met Humble in Conroe, beginning with 35-35.9 gravity.

Jefferson County, Tex.

West Beaumont, see prices under Magnolia in center column.

(Continued on next page)

CRUDE OIL MARKETS

(Continued from preceding page)

South-Southwest Texas (cont'd)

Posted by Humble

**Mirando*

(Effective July 6, 1937)

Below 21	$0.96	31-31.9	$1.18
21-21.9	0.98	32-32.9	1.20
22-22.9	1.00	33-33.9	1.22
23-23.9	1.02	34-34.9	1.24
24-24.9	1.04	35-35.9	1.26
25-25.9	1.06	36-36.9	1.28
26-26.9	1.08	37-37.9	1.30
27-27.9	1.10	38-38.9	1.32
28-28.9	1.12	39-39.9	1.34
29-29.9	1.14	40 & above	1.36
30-30.9	1.16		

*Includes Duval, Jim Hogg, Webb and Zapata counties, Tex. and Heyser and Placedo crudes.

July 6, Magnolia posted same schedule as Humble in Mirando.

July 6, 1937, Texas Co. posted for Duval-Mirando, $0.96 for below 21, plus 2c differential, to $1.12 for 28 & above.

LOUISIANA-ARKANSAS

Posted by Standard Oil Co. of Louisiana

(Effective Jan. 28, 1937)

	*N. La.-Ark.	Rodessa, La.	Roanoke & N. Crowley, S. La. (Dec. 28,'37)	†Columbia County, Ark. (July 7, 1938)
Below 21°	$0.90	$0.93	$0.90	$0.83
21-21.9	for	for	.93	for
22-22.9	oil	oil	.96	oil
23-23.9	Below	Below	.99	Below
24-24.9	25°	25°	1.02	25°
25-25.9	$0.92	$0.95	1.05	$0.85
26-26.9	.94	.97	1.08	.87
27-27.9	.96	.99	1.10	.89
28-28.9	.98	1.01	1.12	.91
29-29.9	1.00	1.03	1.14	.93
30-30.9	1.02	1.05	1.16	.95
31-31.9	1.04	1.07	1.18	.97
32-32.9	1.06	1.09	1.20	.99
33-33.9	1.08	1.11	1.22	1.01
34-34.9	1.10	1.13	1.24	1.03
35-35.9	1.12	1.15	1.26	1.05
36-36.9	1.14	1.17	1.28	1.07
37-37.9	1.16	1.19	1.30	1.09
38-38.9	1.18	1.21	1.32	1.11
39-39.9	1.20	1.23	1.34	1.13
40 & above	1.22	1.25	1.36	1.15

*Includes Caddo, Homer, Haynesville, Sabine, De Soto, Sarepta, Carterville, El Dorado, Bunkie and Miller county.

†Includes Buckner, Magnolia, and Village pools.

Smackover, Ark. $0.90

Urania, La. (Ark. Fuel Oil Co., Jan. 28 '37) $1.02

Posted by Continental Oil Co.

*Tepetate, *Abbeville and *Ville Platte, La. $1.24

*Tepetate effective Jan. 28, 1937; Abbeville and Ville Platte, June 1, 1938.

Jan. 28, 1937, Magnolia met S. O. La.'s No. La.-Ark. gravity and price schedule in Pine Island, Haynesville, Bull Bayou and Cotton Valley, La., and in Eldorado and Rainbow districts, Ark.; and met S. O. La.'s Rodessa prices; and in Lockport, Iowa, Cameron Meadow, La., posted Humble's gravity and price schedule on Mirando. El Dorado East Field, Ark. price same as Smackover, effective Jan. 28, '37.

Jan. 28, The Texas Co. met S. O. La. in N. La., except that its gravity schedule begins with below 27 at $0.94. It posted $1.37 for Garden Island, La., $1.24 for LaFitte, La. and $0.90 for Smackover.

***GULF COASTAL FIELDS**

Posted by Humble Oil & Refining Co. and The Texas Co.

	(Effective Jan. 28, 1937 Humble	Texas	†Refugio Saxet, etc. (Humble) (July 6,'37)
Below 18	$0.95	°$0.95	....
18-18.9	for	for	....
19-19.9	below	below	....
20-20.9	21°	21°	$1.01
21-21.9	0.98	0.98	1.03
22-22.9	1.01	1.01	1.05
23-23.9	1.04	1.04	1.07
24-24.9	1.07	1.07	1.09
25-25.9	1.10	1.10	1.11
26-26.9	1.13	1.13	1.13
27-27.9	1.15	1.15	1.15
28-28.9	1.17	1.17	1 17
29-29.9	1.19	1.19	1.19
30-30.9	1.21	1.21	1.21
31-31.9	1.23	1.23	1.23
32-32.9	1.25	1.25	1.25
33-33.9	1.27	1.27	1.27
34-34.9	1.29	1.29	1.29
35-35.9	1.31	for	1.31
36-36.9	1.33	oil	1.33
37-37.9	1.35	34°	1.35
38-38.9	1.37	and	1.37
39-39.9	1.39	above.	1.39
40 & above.	1.41	....	1.41

†Includes also Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor crudes.

**Humble's prices apply in these Texas fields: Amelia, Barbers Hill, Clinton, Goose Creek, Hull, Liberty, Mykawa, Orange, Pierce Junction, Raccoon Bend, (shallow sand), Sugarland, Thompsons, and West Columbia. Same prices also apply, effective Feb. 1, 1938, in Clinton, Tex., posted by Stanolind.

Jan. 28, Sinclair-Prairie met above Humble schedule in full.

‡$0.95 for oil below 21° posted April 1, 1938.

July 6, 1937, The Texas Co. posted for Refugio, which includes Greta, Saxet and Taft: $1.01 for below 21, plus 2c differential, to $1.17 for 28 & above.

Texas Co. postings in Gulf Coastal Texas include: Arriola, Five Corners, Ganado, Humble, Liberty, Magnet, Manvel, Markham, Mauritz, McFaddin, Pickett Ridge, Port Neches, Sour Lake, West Columbia and Withers. In Gulf Coastal Louisiana: Bay St. Elaine, Caillou Island, Dog Lake, Four Isle, Gillis, Horseshoe Bayou, Iberia, Lake Barre, Lake Pelto, Leesville and Port Barre.

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co.

(Effective Jan. 28, 1937)

Salt Creek, (except Tensleep crude), Midway and Dutton Creek, Wyo., same schedule as Stanolind posts in Oklahoma, Kansas which see under Mid-Continent crude on previous page.

(Effective Jan. 6, 1938)

Tensleep, Salt Creek field $0.70

(Effective Jan. 28, 1937)

Greybull-Torchlight	$1.30
Iles, light, Col.	1.18
Iles, heavy	1.12
Hogback, N. M.	1.33
Big Muddy	1.23

(Effective July 8, 1938)

Elk Basin, light	$1.05
Grass Creek, light	1.05

(Effective May 1, 1938)

Frannie light	$0.65
Grass Creek, heavy	0.50
Hamilton Dome, Wyo.	0.45

(Effective Nov. 4, 1936)

Frannie heavy $0.62

Posted by Ohio Oil Co.

(Effective July 8, 1938)

Elk Basin, Wyo.	$1.05
Grass Creek, light	1.05

(Effective Jan. 28, 1937)

Rock Creek	1 205
Lance Creek	0.97

(Effective May 1, 1938)

Grass Creek heavy $0.50

(Effective Nov. 16, 1937)

Sunburst, Mont. $0.90

Posted by Continental Oil Co.

(Effective Jan. 1, 1938)

Cat Creek, Mont. $1.30

(Effective Jan. 28, 1937)

Big Muddy, Wyo.	$1.18
Lance Creek, Wyo.	0.97

CALIFORNIA, *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective Feb. 26, 1936, except Huntington Beach, Playa del Rey, Santa Fe Springs, Kern Front, Signal Hill (Long Beach) effective March 7, 1936; Elk Hills effective June 22, 1936; Lakeview Area, Aug. 19, 1936; El Segundo and Wilmington, Oct. 15, 1937; Greeley-Canal, July 9, 1938; Santa Maria Valley, by Union Oil, May 20, 1938.

Gravity	Signal Hill (Long Beach) El Segundo †Wilmington	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda Brea Canon	Athens Rosecrans	Dominguez	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	‡Newhall and others	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset Lakeview Area	Greeley-Canal (Kern County)	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria (Union Oil)
13-13.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	$0.40
14-14.9	$0.80	$0.79	$0.74	$0.78	$0.79	$0.80	$0.76	....	....	$0.80	$0.76	$0.76	$0.77	$0.78	....	$0.70	....	$0.70	$0.70	....	$0 0	$0.70	....	.42
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.44
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.45
17-17.9	.80	.79	.74	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.46
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.47
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	....	.70	.70	.74	.74	....	.74	.71	.70	.48
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	....	....	.70	.78	.78	....	.78	.72	.70	....
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	.78	....	.73	.82	.82	....	.82	.74	.70	....
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	....	.77	.87	.87	....	.86	.78	.72	....
23-23.9	.95	.86	.77	.96	.99	1.02	.96	.84	.79	.96	.88	.93	.82	.92	.78	....	.80	.92	.92	....	.90	.82	.76	....
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	.99	.91	.96	.85	.96	.82	....	.84	.97	.97	....	.94	.86	.79	....
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	1.02	.95	....	.89	.99	.86	....	.88	1.01	1.01	....	.98	.90	.83	....
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	1.05	.98	....	.92	1.03	.90	....	.91	1.06	1.06	....	1.02	....	....	....
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	1.02	....	.96	1.06	.95	....	.95	1.10	1.10	$0.91	1.06	....	....	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	1.06	....	.99	1.10	.99	....	.99	1.15	1.15	.94	1.10	....	....	....
29-29.9	1.17	1.15	.93	1.18	1.18		1.17	1.12	.93	....	1.09	....	1.03	1.14	1.03	....	1.02	1.20	1.20	.98	1.14	....	....	....
30-30.9	1.21	1.19	.95	1.22	1.21		1.21	1.17	.95	....	....	....	1.07	1.17	1.08	....	1.06	1.25	1.25	1.02	1.18	....	....	....
31-31.9					1.24		1.24	1.22	.97	....	....	....	1.11	1.21	1.12	....	1.09	1.29	1.29	1.06				....
32-32.9	*Elwood Terrace			....	1.27		1.27	1.27	1.00	....	....	....	1.14	1.25	1.16	....	1.13	1.34	1.34	1.09	Kettleman Hills			....
33-33.9	....	1.28	....	....	....		....	1.32	....	....	....	....	1.18	1.28	1.20	....	1.17	1.38	1.38	1.13	....	1.19	....	....
34-34.9	....	1.32	....	....	....		....	1.37	....	....	....	....	1.22	1.32	1.25	....	1.20	....	....	1.17	....	1.23	....	....
35-35.9	....	1.35	....	....	....		....	1.42	....	....	....	....	1.25	....	1.29	....	....	....	....	1.20	....	1.27	....	....
36-36.9	....	1.39	....	....	....		....	1.46	....	....	....	....	1.29	....	1.33	....	....	....	....	1.24	....	1.31	....	....
37-37.9	....	1.43	....	....	....		....	1.51	....	....	....	....	1.32	....	1.37	....	....	....	....	1.28	....	1.35	....	....
38-38.9	....	....	....	....	....		....	1.56	....	....	....	....	1.36	....	1.42	....	....	....	....	1.31	....	1.39	....	....
39-39.9	....	....	....	....	....		....	1.61	....	....	....	....	1.40	....	....	....	....	....	....	1.35	....	1.43	....	....
40-40.9	....	....	....	....	....		....	1.66	....	....	....	....	1.43	....	....	....	....	....	....	1.39	....	....	....	....
41-41.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.43	....	....	....	....
42-42.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.46	....	....	....	....
43-43.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.50	....	....	....	....
44-44.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.54	....	....	....	....
45-45.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.57	....	....	....	....
46-46.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.61	....	....	....	....
47-47.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.65	....	....	....	....
48-48.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.68	....	....	....	....

F. O. B. Standard Pipe Line

*F. o. b. ship.

‡Also McKittrick, Kern River. Kern Front and Round Mountain $0.70 thru 19.9 gravity; no higher gravity quoted.

†Wilmington prices differ on gravities below 18.9. Prices are: 14-16.9, $0.75; 17-17.9, $0.77; and 18-18.9, $0.79; rest of schedule same as Signal Hill.

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Coming Meetings

Mississippi Oil Dealers, Jackson, Miss., some time in Sept.
American Chemical Society, Milwaukee, Wis., Sept. 5 to 9.
Kentucky Petroleum Marketers Assn., annual fall conference and golf tournament, Brown Hotel and Big Spring Golf Club, Louisville, Sept. 8.
National Petroleum Assn., 36th annual meeting, Hotel Traymore, Atlantic City, Sept. 14, 15 and 16.
Oil Trades Assn. of New York, sports day, Pelham Country Club, Pelham, N. Y., Sept. 20.
National Association of Petroleum Retailers, annual meeting, St. Louis, Sept. 27, 28 and 29.
American Assn. of Petroleum Geologists, mid-year meeting, under direction of West Texas Geological Society, El Paso, Tex., Sept. 27-Oct. 2.
National Assn. of Credit Men, Southwest Credit Conference, San Antonio, Tex., some time in Oct.
National Lubricating Grease Institute, 6th annual meeting, Chicago, Oct. 3 and 4.
Ohio Petroleum Marketers Assn., fall conference and golf tournament, Ohio Hotel and Southern Hills Country Club, Youngstown, O., Oct. 5, 6.
American Institute of Mining and Metallurgical Engineers, Petroleum Division, Plaza Hotel, San Antonio, Tex., Oct. 5-7.
New England States Tax Officials Assn., 26th annual conference, Bangor, Me., Oct. 6, 7.
Society of Automotive Engineers, national regional fuels and lubricants meeting, Tulsa, Okla., Oct. 6 and 7.
Montana National Bituminous Conference, sponsored by Western Petr. Refiners Assn. and Mont. and Miss. highway departments, Edgewater Gulf Hotel, Biloxi, Miss., Oct. 10 to 13.
American Gas Assn., Atlantic City, N. J., Oct. 10 to 14.
National Safety Congress, Petroleum Section, Hotel Stevens, Chicago, Ill., Oct. 10 to 14.
North American Gasoline Tax Conference, Tulsa, Oct. 10 to 14.
Indiana Independent Petroleum Assn., Fall convention, Hotel Severin, Indianapolis, Ind., Oct. 12 and 13.
National Stripper Well Assn., and Oklahoma Stripper Well Assn., annual meetings, Tulsa, Okla., Oct. 18.
Independent Petroleum Assn. of America, Tulsa, Okla., Oct. 19, 20 and 21.
American Inst. of Mining & Metallurgical Engineers, Petroleum Division, Los Angeles, Oct. 20, 21.
National Assn. of Credit Men, Petroleum Refiners Division, Indianapolis, Athletic Club, Indianapolis, Ind., Oct. 24, 25, 26.
National Tax Conference, Hotel Statler, Detroit, Oct. 24 to 28.
National Petroleum Assn., Dept. of Fire & Accident Prevention, Semi-Annual Meeting Olean, N. Y., Oct. 26.
Mid-Continent Oil & Gas Assn., Texas Division, San Antonio, Tex., Oct. 27, 28, 29.
American Trucking Assns., Inc., 5th annual convention, Detroit, Oct. 31-Nov. 2.
Oil Trades Assn. of New York, annual banquet, Waldorf-Astoria Hotel, New York, Nov. 1.
American Institute of Mining and Metallurgical Engineers, regional meeting, Tucson, Ariz., Nov. 1 to 5.
American Assn. of Petroleum Geologists, Pacific Section, Los Angeles, Calif., Nov. 3, 4.
National Automobile Show, Grand Central Palace, New York, Nov. 11 to 18.
National Motor Truck Show, Port of New York Authority Bldg., New York, Nov. 11 to 18.
Society of Automotive Engineers, annual dinner, Commodore Hotel, New York, N. Y., Nov. 14.
American Petroleum Institute, 19th annual meeting, Stevens Hotel, Chicago, Ill., Nov. 14 to 18.
American Society of Mechanical Engineers, Philadelphia, Pa., Dec. 4 to 9.
Exposition of Chemical Industries, Grand Central Palace, New York, Dec. 4 to 9.
Nebraska Petroleum Marketers, Inc., Omaha, Nebr., Dec. 6 to 8.

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Society of Automotive Engineers, annual meeting, Detroit, Mich., Jan. 9 to 13.
Northwest Petroleum Assn. (Minnesota Division), Lowry Hotel, St. Paul, Minn., Jan. 26 and 27.
Twelfth National Asphalt Conference, auspices of The Asphalt Institute, Biltmore Hotel, Los Angeles, Feb. 20 to 24.
World Automotive Engineering Congress, sponsored by S. A. E., for New York, Indianapolis, Detroit, San Francisco, May 22 to June 8.

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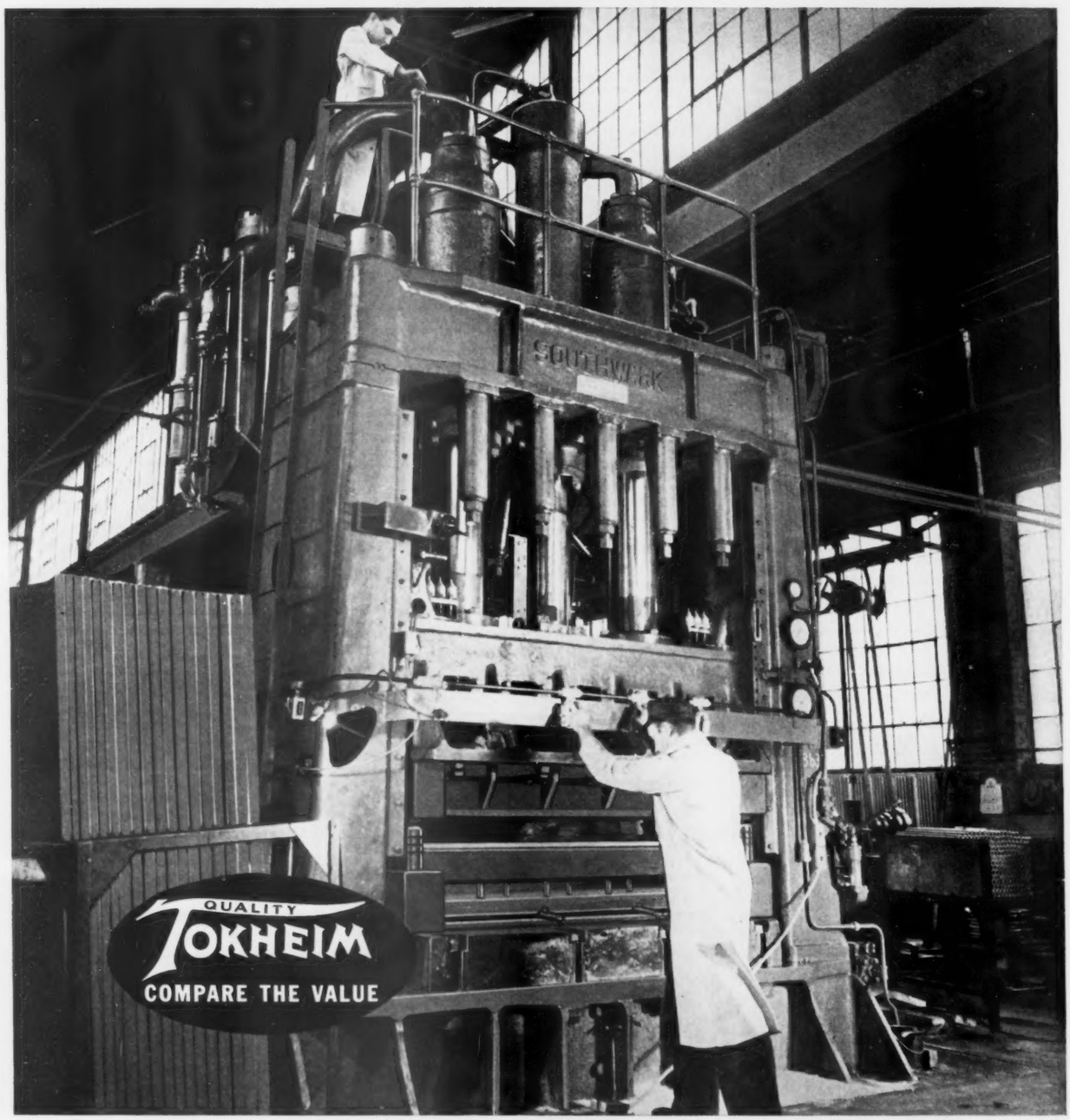

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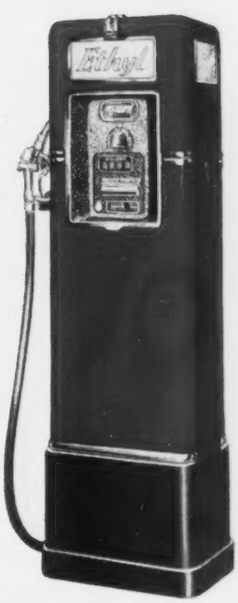

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